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Original Contributions

Biliary Stricture

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A SIMPLE and inclusive definition of biliary stricture is difficult to formulate because the anatomical variations are so numerous. The types range from a localized stenosis, which the term "stricture" first brings to mind, to the complete surgical absence of most of the extrahepatic ducts. Inevitably, all stages between these extremes exist. Their clinical counterparts can be equally diverse.

Perhaps a stricture is best considered as a clinical concept wherein obstruction of the extrahepatic biliary system other than solely from calculus, provokes one or more of the symptoms of jaundice, cholangitis or pain. The etiological mechanisms can be congenital, neoplastic, inflammatory, or traumatic. As with most other persons writing on this subject, our interest in this study centers around those clinical instances arising from surgical injury. In this group of adult patients to be presented, all cases, save one, were of this traumatic type and occurred following the operations of cholecystectomy, cholecystostomy or choledochostomy. There was one case which had had no prior operation. In this person the lesion was classified as of inflammatory origin.

History

Although the first references to biliary stricture date from the French literature of the 1820's, when both Andral in 1824¹ and Bauillaud in 1827² reported this clinical symptom complex secondary to inflammatory and neoplastic causes, it was not until after cholecystectomy was introduced by Langenbuch³ in 1882, and his contemporary surgeons used this procedure, that biliary strictures became a serious medical problem. One cannot disregard the coincidence between an increasing number of gall bladder operations and a heightened

prevalence of biliary strictures. Doyen, in 1892, was the first to report the use of end-to-end anastomosis for a divided common bile duct. Sprengel in 1891 recorded the successful anastomosis of the common bile duct to the duodenum. During the intervening years since then a wide variety of surgical techniques have been proposed and tried in order to re-establish the continuity of an injured extra-hepatic biliary duct either to itself or to the intestine. In 1918⁴ and 1936⁵ Eliot of New York, based on his collection of case reports from the literature, attempted to classify and evaluate the results of treatment in terms of the type of surgical repair. The experience at the Lahey Clinic was described in 1947 by Cattell,⁶ and in 1950 by Lahey,⁷ the latter reporting on 280 cases. There had been a two-year follow-up in 229 of them. This group achieved 73 per cent favorable results for either the end-to-end or the choledocho-intestinal anastomoses. Walters has summarized the surgical accomplishments with 254 biliary stricture cases. Choledochoduodenostomy was the most common operation at the Mayo Clinic from 1924 to 1947. Eighty-two per cent of these persons had satisfactory results.

Analysis of the Present Series

Between 1935 and 1955, seventy consecutive adults have been treated surgically for biliary stricture.

TABLE I. DISTRIBUTION OF SEX

Male	9
Female	61

TABLE II. DISTRIBUTION OF AGE

10-19	20-29	30-39	40-49	50-59	60-69	70-79
1	10	13	23	15	6	2

The sex and age distribution indicate that the average patient was a woman between forty and fifty years of age (Tables I and II).

From the Department of Surgery, University of Minnesota Medical School and the University of Minnesota Hospitals.

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We believe it is significant that two-thirds of all the persons afflicted were less than fifty years old. In this series, a young mother all too frequently was stricken while in reasonably good health. Ninety-five per cent (fifty-nine of the sixty-two cases available) have been checked upon as out-patients for at least two years after their last operation. Three patients have been lost to follow-up despite protracted attempts to contact them. An additional eight cases remain under observation for intervals up to two years. Questionnaires were sent to all available patients so that the information would be current. The family physician's appraisal of the patient's health was also sought.

The following classification of operative procedures was devised to catalogue the various methods employed in dealing with the biliary stricture problem at the University of Minnesota Hospitals:

- I. Total external biliary fistula.
- II. Partial external biliary fistula with T-tube.
 - A. Stricture dilated and T-tube inserted through this area.
 - B. Stricture incised and closed over T-tube.
 - C. Stricture excised with T-tube bridging gap.
 - D. Stricture excised with T-tube brought through the line of anastomosis.
 - E. Stricture excised with T-tube brought out distal to line of anastomosis.
- III. Internal biliary fistula.
 - A. Choledochogastrostomy.
 - B. Choledochoduodenostomy.
 - C. Choledochojejunostomy.
- IV. Dissection failure—i.e., failure to find the biliary duct proximal to the stricture.

The results have been classified as:

- (S) Satisfactory
- (I) Improved but with residual symptoms
- (U) Unsatisfactory
- (L) Follow-up inadequate (less than two year. or lost)
- (E) Expired

Our attempt at an evaluation of the results has been necessarily arbitrary. In the terminology used the distinction in a given case between a satisfactory and an improved result might be difficult or impossible. Any patient who has had previous unsuccessful attempts at surgical repair can show some liver damage as a result of recurrent biliary tract infection and obstruction. An otherwise effective anatomical result may then fail to resolve all lingering aspects of hepatic disease. The

exact distinction between this result and a less perfect biliary tract restoration in another patient who has been without as much associated liver injury, becomes conjectural. The "best" result the first individual could attain might have to be scored as an improved result. The other three end result categories were usually more easily determined; and, those patients with recurrent jaundice or cholangitis were obviously unsatisfactory.

TABLE III. OVER-ALL OPERATIONS PERFORMED

Patients	70	
Operations elsewhere	104	
Operations here	109	
Total operations	213	3.04/pt.
Operations for stricture here	89	1.27/pt.

Table III lists the number of surgical procedures, and as can be noted, each patient underwent an average of three operations. In addition to the original surgery, many persons had one or more repairs prior to coming to the University of Minnesota Hospitals. The discrepancy between the number of operations performed here and the number of operations for stricture performed here arises from the need for additional surgery either for complications or for the sequelae of the stricture operations. For instance, gastric resection for duodenal ulcer (probably) provoked by the stricture and its consequences, was required in two individuals.

The symptom complex of jaundice and/or chills and fever following biliary surgery regularly identified for us the case as one with a stricture. All but six patients exhibited jaundice on admission and three of these exceptions had a total external biliary fistula. The other three had been icteric upon prior occasion. Thirty-three of the seventy patients (47 per cent) came here with chills and fever or had recently exhibited these findings.

An analysis of the results of the several methods of correction as attempted by a changing staff at the University of Minnesota Hospitals, suggests certain considerations. The most common repair attempted was an end-to-end anastomosis with a limb of the T-tube brought out through the line of the anastomosis (Table IV; II, D). Recurrences were common (and well-nigh predictable) after this procedure. The discharge of abundant volumes of bile through the abdominal drains during the postoperative period virtually assured this likelihood. After the omission of those patients

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with an inadequate follow-up and the cases expiring postoperatively, only 40 per cent, or ten of twenty-five persons so treated, had a satisfactory end result. When the procedure was

if it is appreciated that this particular procedure (choledochojejunostomy) was often employed when other methods had proven unsatisfactory.

The consequences of dissection failures are self-

TABLE IV. CLASSIFICATION OF SURGICAL PROCEDURES

Results	I	II						III				IV
		A	B	C	D	E	Total	A	B	C	Total	
S(Satisfactory)		4	1	1	10	6	22		3	8	11	
I(Improved)				1		2	3		1	1	2	
U(Unsatisfactory)	3	6			15	3	24	1	1	1	3	
L(Follow-up inadequate)		1			2	1	4		4	3	7	
E(Expired)	3				2	1	3		1		1	3
No. of operations	6	11	1	2	29	13	56	1	10	13	24	3

TABLE V. OPERATIVE AND PATIENT MORTALITY

Operations	Deaths	Per Cent
109	10	9.2
Patient Mortality 59* (adequate follow-up)	15**	25.4

*Patients having two year follow-up.

**There were five late deaths considered due to stricture.

otherwise comparable but for the simple expedient of bringing the T-tube out distal or proximal to the suture line, the outlook was distinctly more favorable (eight of eleven could be classified as satisfactory or improved) (Table IV; II, E). It is pertinent to note that this type of reconstruction is possible (and probably successful) only in persons with a localized stricture. Here the new union can easily be achieved without either undue shortening or disruptive tension. Success will depend also on having the duct diameters almost equal proximal and distal. We were surprised to find that one individual with a localized stenotic type of stricture was satisfactorily managed by a longitudinal incision and a transverse closure. Mere dilatation of this localized type of stricture followed by the insertion of a T-tube was a long term failure in six of ten attempts.

The results of choledochointestinal anastomosis have been consistently better. Thirteen of sixteen (81 per cent) (Table IV; III, B, C) persons so treated secured a satisfactory or improved result. This percentage of successes was even higher when the repair consisted of a choledochojejunostomy. The outcome in nine of ten such cases was satisfactory. This result assumes additional significance

TABLE VI. MORTALITY ANALYSIS

Type	Cases	Time	Cause
I. Dissection Failures	M.A.	P.O.	Failure to find proximal duct
	M.S.	P.O.	Failure to find stricture—biliary cirrhosis, hepatitis
	J.S.*	P.O.	Failure to find stricture—thought to have ca. of pancreas
II. Hemorrhages	C.B.**	P.O.	Hemorrhage
	M.F.**	P.O.	Hemorrhage and subphrenic abscess
	K.H.	P.O.	Hemorrhage
III. Infection***	A.E.	P.O.	Peritonitis, subphrenic abscess, pancreatitis
	D.M.	P.O.	Liver abscess, biliary cirrhosis
	P.B.	P.O.	Liver abscess
	O.W.	P.O.	Pancreatitis, interstitial nephritis, bilateral atelectasis
IV. Late	A.B.	1 yr.	Hepatic artery injured and sutured at surgery—expired from ruptured aneurysm of hepatic artery.
	R.G.	13 yrs.	Expired following surgery for bleeding DU—extensive biliary cirrhosis.
	E.S.	6 mos.	Liver abscesses, suppurative cholangitis, recurrence of stricture.
	E.R.	6 mos.	Recurrence of stricture bleeding.
	M.R.	5 yrs.	Recurrence of stricture, biliary cirrhosis.

*Only case not having had previous biliary surgery

**Both cases prior to 1936

***All cases have been since 1942

incriminatory. Unless the technical problems were solved, the patient died.

The operative mortality (10/109—9.2 per cent) for this series of procedures is listed in Table V. The overall mortality of 25 per cent, including the late deaths to which the stricture contributed, emphasizes the gravity of this surgical problem. It is a benign lesion, but I don't think anyone would refer to it as a "benign condition." This is an unfair play on words.

A study of the deaths reveals four main causes:

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TABLE VII. OVERALL RESULTS

	Number	Per Cent
Satisfactory (S)	34	48
Improved (I)	4	6
Unsatisfactory (U)	6	9
Follow-up inadequate (L)	11	16
Expired (E)	15	21
Total	70	100

dissection failures, hemorrhage, infection and late sequelae (Table VI). Two of three patients with fatal hemorrhage succumbed prior to the advent of vitamin K therapy. The deaths from infection occurred despite combinations of antibiotic therapy. Of the late deaths one seems attributable directly to the surgical procedure, while the other four arose as a consequence of the unresolved stricture problem.

Discussion

The tragic aftermaths of this iatrogenic affliction have been impressed upon us during the hours spent reading the often voluminous hospital charts of these patients. Effective prophylaxis against this regrettable situation is surely far superior to the best possible reconstructive procedure. The latter will always entail a period of pain and an element of anesthetic and operative risk that would not have been required had the initial procedure gone well. The experience of many surgeons, each having done more than a thousand operations upon the biliary tract without provoking this grave outcome, confirms the belief that the standard types of operations on the gall bladder should be devoid of such disasters.

We wish to avoid knocking into tree after tree while trying to get out of the forest, but do desire to attract attention to certain particularly distressing features of the common duct stricture problem. In two-thirds of the patients of this series, this tragedy fell upon women under fifty years of age. The expense to someone with a young mother away from home for a protracted interval during the mid-period of life, could scarcely be less serious economically were it to have happened to the wage-earning father. The other losses to the community and to the family are incalculable. Over and beyond the time spent in the hospital are often prolonged convalescent interludes, or, worse, those of recurrent partial disability. In yet other instances the patient never quite regains full health. Furthermore, undesirable residues of this condition

are difficult to eliminate. Biliary cirrhosis, duodenal ulceration, portal hypertension from inflammatory obstruction, and yet other sequelae have developed in these people as a consequence of the common duct injury and the trauma secondary to attempts at its correction. The deadly seriousness of this problem is pointed up by the mortality of 25 per cent. These deaths, we believe, are largely ascribable to the stricture and/or to the subsequent procedures designed to correct it.

There can hardly be any reasonable opposition, it would seem, to emphasis on, and devotion to, the practice of those surgical techniques that will effectively prevent the occurrence of a common duct stricture. This is surely the challenging obligation in all centers training surgeons. The technical cautions to be observed are well described in the medical literature dealing with surgery for this area. Briefly, the operator must be indoctrinated never to divide any structure presumed to be the cystic duct until the common duct proper and the common hepatic duct have been thoroughly exposed and unquestionably identified. The apparent presence of anomalous structures should alert anew the prudent surgeon. Secondly, any untoward arterial bleeding from an inadvertently divided vessel should be managed by digital compression via Winslow's foramen while the specific leak is carefully sought for and forceps-point hemostasis secured. Inadequate dissection followed by clamping, cutting, and mass ligation before the complete identification of these specific ductal tributaries; indiscriminate, awkward, hasty, grasping instrumentation for a bleeding site in the portal hilus; and a common duct stricture is conceived. When this offspring, disturbing to contemplate, reaches full growth, few would care to acknowledge the paternity.

The next phase to be considered at this early stage in the growth of this problem child is the matter of affirming its existence. This diagnosis may become self evident, on an initial careful study of the history and corresponding work-up of the patient. Customarily, this identification will be more readily made by those persons less intimately involved with the creation.

There are certain clinical features supporting the diagnosis of a biliary stricture following a cholecystectomy. The development of very profuse, persistent bile discharge from wound or drainage site after cholecystectomy should alert one to the fact that the duct may have been severed. Those

patients who become unremittingly jaundiced and have a minimal pigment content in the stools from the day of surgery henceforth, suggest that the duct has been tied off. Another identifiable group is represented by those who recover from their immediate surgery but sometime thereafter develop the symptom complex of chills, fever and right upper quadrant pain associated with icterus. These late occurrences of stricture usually arise from scarring at the site of a previous injury. Here, as the fibrous tissue replaces the damaged mucosa the normal flow of bile is slowly throttled. It should be mentioned that this latter clinical picture can be perfectly simulated by choledocholithiasis and operative exploration may be the only method of making a differentiation.

In the fallacious hope that an individual with a stricture might spontaneously be cured through non-operative management, there is at times undue procrastination before electing effective surgical therapy. This tendency is most pronounced following a stricture repair that turns out unsatisfactorily and the feeling waxes with one's memory of heightened tribulations during the previous efforts. Perhaps the responsible surgeon remembers these moments of trial and mentally rejects the unwelcome and ominous portent of recurrent chills, fever, and jaundice. This is indeed regrettable, for biliary cirrhosis secondary to recurrent obstruction and cholangitis may progress to irreparable liver damage. In addition, recurrent bouts of cholangitis can so destroy the ductal mucosa that a satisfactory repair becomes almost impossible. It seems wiser therefore to construe the onset of the above-mentioned symptom complex, following the removal of a T-tube or a similar splint, as a recurrence of the stricture. With this decision made, appropriate re-operative therapy is the rational course.

The obvious and traditional method of repair has been end-to-end anastomosis of the strictured duct. In its idealized form the normal anatomy is thereby restored. Though often technically difficult, it can be accomplished, after a fashion, even when a large portion of the duct is absent. As Lahey and his colleagues have shown, it is possible to expose the proximal common bile duct in the substance of the pancreas and, by mobilizing the duodenum, approximate the duct ends in a high percentage of cases. With some temerity we suggest that perhaps the results would be superior if so frequent a recourse to end-to-end union were

not employed as the method of choice—particularly in those cases where either a disproportion of stoma or tension exists. Moreover, if end-to-end anastomosis is used, our own experience as well as that of others indicates that any T-tube used must be brought out through a new opening in the duct wall well away from the lines of anastomosis. Proponents of end-to-end anastomosis contend that the sphincter of Oddi is essential for the prevention of intestinal content regurgitation into the biliary tract, if we are to avoid subsequent bouts of cholangitis for the patient. They, therefore, reserve choledocho-intestinal anastomosis for individuals in whom end-to-end anastomosis is not technically feasible.

Considerable evidence against this concept can be found in the evaluation of spontaneous, asymptomatic, internal biliary fistulas which cause no symptoms as long as they remain unobstructed. The experience of many surgeons has been that a choledocho-intestinal anastomosis does not cause cholangitis when this stoma remains free of obstruction. Finally, symptoms from this type of biliary tract drainage are habitually absent, when the operation is done for reasons other than stricture. Also in favor of the choledocho-intestinal union as compared to the end-to-end anastomosis, is the greater simplicity of the dissection. The surgeon has to find only the proximal end of the duct. The ease of the repair is likewise enhanced. The difficulties of precise end-to-end anastomosis where the duct ends are of unequal diameter are well known and evoke no surgical serenity in the post-operative moments of reflection.

We have approached this subject without rigidly preconceived ideas as to which technique might be the most satisfactory method of repair. With the evidence at hand we are now convinced that a uniformly superior result can be expected from a well-done, mucosa-to-mucosa, tension free, choledocho-intestinal anastomosis. Case analyses from both the Mayo Clinic and Lahey Clinic material reveal comparable accomplishment with either method, but the authors express the opinion that choledocho-intestinal anastomosis should be reserved for the more difficult of the stricture types, i.e., those in which end-to-end anastomoses are not practicable. The outcome in their hands was comparable, although they used the former preferentially in the worst cases. Because they noted as well that the choledocho-intestinal procedure was more easily performed, perhaps the

choledocho-intestinal anastomosis should be re-evaluated. It may be the operation of choice rather than the method attempted only when end-to-end anastomosis is not easily done or has been recurrently unsuccessful. Admittedly, there are certain disadvantages to the Roux-en-Y type of choledocho-jejunostomy that is constructed without provision for bile re-entrance into the duodenum. This results in a form of the Mann-Williamson ulcer abetting operation. Two of our patients in this group subsequently required treatment for a duodenal ulcer. To avoid this, the jejunal limb can be re-anastomosed back onto the duodenum. On this basis and where technically possible, a choledocho-duodenostomy may be therefore the choledocho-intestinal operation of choice for biliary stricture.

From personal skirmishes with the biliary stricture problem a plan has gradually developed that has proved workable and useful. The procedure to be described carries no allegations of newness or originality but does possess for us advantages in surgical exposure and accomplishment that incline one towards its further testing.

Insofar as possible, prothrombin deficits are corrected and any serious contractions of blood volume and red cell mass are restored to normal values. The effectiveness of wide spectrum antibiotics is tested in all persons with fever and chills. Other antibiotic preparations capable of eliminating the usual bacterial flora of the intestinal tract are customarily but not always provided. An indwelling nasal gastric tube is connected to suction for several hours prior to the operation. This in combination with the antibiotics, permits the surgeon to work more advantageously in an abdomen where all the bowel within the visible limits freed by his dissection, is found to be stool free and collapsed.

A thoraco-abdominal incision well up the right seventh or eighth interspace and then transversely across the upper recti has much to recommend it. Once the diaphragm has been incised, the right lobe of the liver can be loosened from surrounding adhesions, delivered laterally and superiorly and dissection of the portal hilus is thereby considerably facilitated. By sharp instrument technique the hepatic artery and its major divisions are extricated from the surrounding scar tissue. The dissection is then approached from lateral to medial and begins at the lower edge of the right

lobe of the liver. Any adherent duodenum or jejunum that was used in an earlier procedure should be cut free and next the overlying tissues cleaned away until the edge of the portal vein is quite evident. Now the residual of the common duct must be between these dissections and the surgeon need only remove the thickened hepatic capsule and cone out the intervening scar to yield the bile duct(s). We believe ultimate success in each case hinges on the surgeon's insistence on cutting far enough back on this structure so that all granulomatous, scarred, biliary tract is removed. Unless one makes this sacrifice of tissue back to good and healthy duct wall, a failure by restricting becomes almost predictable.

Having developed by this amputation a fresh mucosal surface for the new stoma (or even up to three intra-hepatic duct ostia when it becomes necessary to curette that much liver away in order to secure an ample length of healthy bile tract), it can then be united mucosa-to-mucosa either to the duodenum or to a jejunal loop. For this anastomosis we prefer interrupted, fine (0000 or 00000) silk. At times it may be necessary to place the entire circumference of sutures, tagging each, before tying a single one. Once the gut is approximated to the bile duct no room remains for accurate stitch placement. Final tacking bites approximate the serosal surface to the adjacent thickened liver capsule to minimize distraction across the suture line. No internal splints are usually inserted, for they are unnecessary if the anastomosis is well done. If it is not, serious leakage will occur postoperatively. A new stricture will almost surely develop. And, any tube through the anastomosis will provide scant protection against the bile peritonitis and none against the recurrent stricture. Furthermore, almost all tubes are provocative of some tissue reaction when in contact with a raw surface. Theoretically and perhaps practically, they are capable of inciting an excessive scarring tendency at the suture line.

Before completion of the operation, continuous catheter drainage is provided for the thoracic space and the entire incision closed with silk. All forms of abdominal drains are omitted. Throughout the dissection the bleeding may be steady and has an aggravating tendency to obscure the field. It further enhances the problem of identifying vital anatomical landmarks. Flushing these oozing surfaces with icebox cold, rather than warm,

Ringer's solution will assist in controlling the seepage from the innumerable capillaries that have been divided. All blood lost should be replaced volume for volume. These procedures often re-

operations, prolonged hospitalization, and sometimes produces a permanent disability. As well, there is a mortality rate as high as that recorded for many forms of gastrointestinal malignancy.

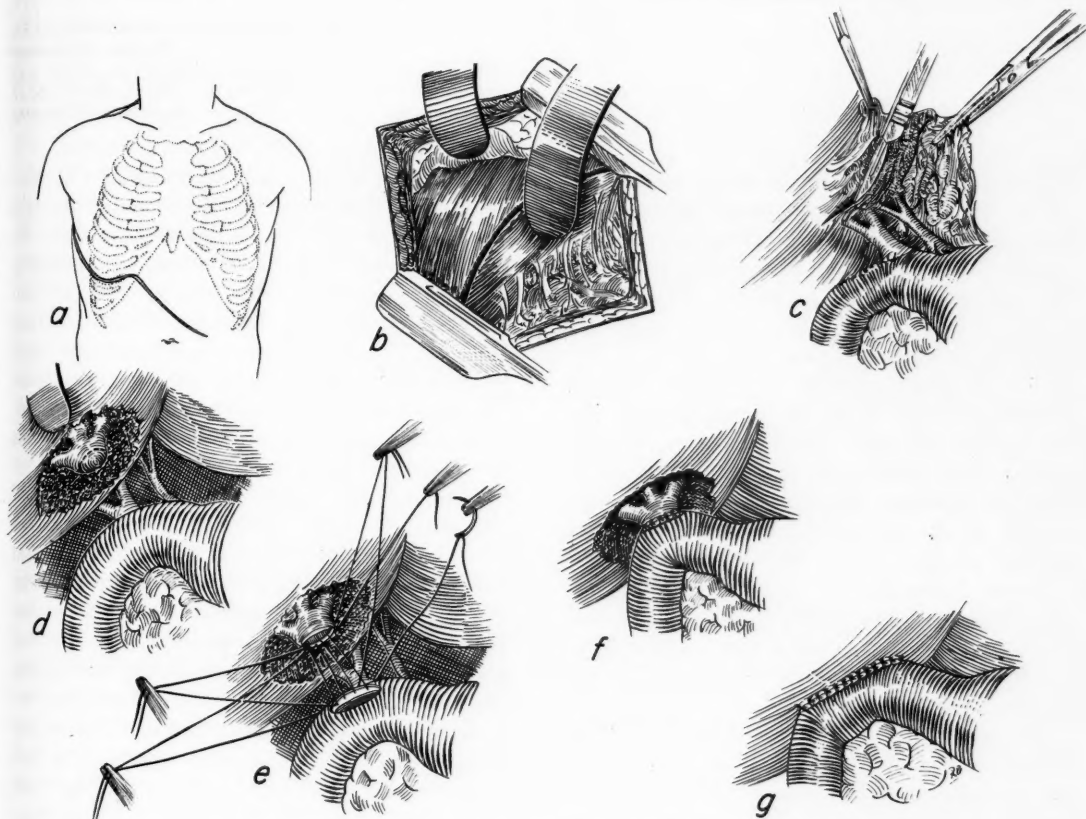


Fig. 1. Technique of exposure and repair of biliary stricture by choledocho-duodenostomy. (a) Line of incision. (b) Exposure showing right lobe of liver. (c) Dissection of hilus of liver to demonstrate portal vein and hepatic artery. (d) Coned out liver hilus to disclose blind end of biliary duct(s). (e) Placement of mucosa-to-mucosa stitches. (f) Completed anastomosis. (g) Buttressing layer duodenum to liver capsule.

quire many hours of unhurried work. Time so spent becomes a rewarding experience when a successful result retrieves for the patient a health that has been devastated by a common duct stricture.

Summary

1. The results of surgery for biliary stricture on seventy patients seen at the University of Minnesota Hospitals since 1935 have been reported.

2. It is again emphasized that this is essentially a preventable disease; it is responsible for significant patient morbidity, often demanding multiple

3. The traditional concept of end-to-end anastomosis with preservation of the sphincter of Oddi as the ideal form of treatment, is re-examined and questioned. Our results, as well as our analyses of the evidence from earlier publications show that equally satisfactory results can be obtained with choledocho-intestinal anastomoses.

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Pigmented Villonodular Synovitis

A Clinical and Pathologic Study

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THE dark-brown to yellow villous and nodular projections from the synovial surface into a joint affected by pigmented villonodular synovitis produce a dramatic gross picture that is virtually pathognomonic of the condition. The relative rarity of this disease delayed an understanding of its pathologic evolution and natural history until the classic description by Jaffe and associates in 1941. A review of the literature and an analysis of their personal experience with twenty cases formed the basis of their article. Previous observers had recorded fifty-seven examples of the diffuse and circumscribed forms of pigmented villonodular synovitis of joints under a variety of names. There is no significant sex predilection for this disease, which, in its diffuse form, is common in young adults. The average age of the patients affected by the focal synovial lesions is older.

As just indicated, pigmented villonodular synovitis may affect the entire joint or may present as a focal tumor in an otherwise normal synovium. It may be debated whether the localized, often pedunculated, capsular or intra-articular growths are basically the same as the diffuse lesions. Evidence indicates that the tumor commonly called "xanthoma," or "benign synovioma of tendon sheaths," is only a different manifestation of the proliferative process in classic diffuse pigmented villonodular synovitis.¹⁻⁴ The focal lesions in the joint may look just like the characteristically solid tumors of tendon sheaths or they may be villous and spongelike, as in the diffuse lesions.

Abridgment of thesis submitted by Dr. Atmore to the Faculty of the Graduate School of the University of Minnesota in partial fulfillment of the requirements for the degree of Master of Science in Orthopedic Surgery.

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Additional evidence that tenosynovial "xanthomas" and diffuse pigmented villonodular synovitis are closely related is the observation that the nodular masses in the latter disease are morphologically identical to the former. In rare instances,^{1,5} bursae not connected with joints are affected by a proliferative process of the type seen in the diffuse articular lesions. This proliferative lesion involving the hip joint but presenting as a mass in the femoral triangle and as an intra-abdominal tumor has been reported.⁶

There are now slightly more than 100 recorded examples of pigmented villonodular synovitis of joints. The involvement was diffuse in somewhat less than half of these. All of the lesions were in the lower extremity. Except for six lesions in the hip⁷⁻⁹ and seventeen in the ankle and tarsal bones,^{1,3,10-12} all lesions involved the knee joint. The extremely rare examples of bursal involvement have been seen in the region of the knee, the ankle and the iliopsoas muscle. More than half of tenosynovial "xanthomas" are in the fingers or at the metacarpophalangeal joints, while the locations next in frequency are the palms, wrists, toes, ankles, arms and legs.¹³

The cause and exact nature of pigmented villonodular synovitis and these related conditions are still unknown. Among the unproved theories is the concept that the process is a reactive inflammation of unknown origin.¹ Fisk¹⁴ considered that the idiopathic syndrome of intermittent hydrarthrosis is a precursor of pigmented villonodular synovitis. Equivocal evidence that the typical disease can be produced by injection of blood into joints has been presented.¹⁵ Jaffe and co-workers¹ were unable to effect any appreciable permanent change in rabbits by this method. Bennett¹⁶ has suggested that the reactive process of pigmented villonodular synovitis may represent a form of benign synovioma. Wright¹⁷ stoutly maintained that the entire group of lesions already

mentioned is neoplastic, and he called them "benign giant-cell synoviomas."

Present Series

Our initial interest in pigmented villonodular synovitis was stimulated by the increased incidence of the disease at the Mayo Clinic in recent years. It was hoped that detailed study of the cases at the clinic might help to elucidate the cause of the condition and aid in determining whether a relationship exists between it and neoplastic disease of the synovium. It was elected to limit this study to pigmented villonodular synovitis as found in the joints and to two cases in which the process apparently was confined to popliteal bursae.

The cases in this series were obtained by examination of the pathologists' reports on all soft-tissue lesions of the lower extremity on file at the Mayo Clinic from January, 1920, to July, 1954. The review was limited to joints of the lower extremity because reports of articular pigmented villonodular synovitis above the hip² could not be found in the literature. Any lesion reported to contain giant cells, iron pigment, foam cells or villous projections and involving a joint space was subjected to further study.

The gross specimens of any suggestive lesions, all of which were available for study, were then examined. New microscopic sections were prepared from various parts of all the specimens as indicated. A stain for iron was performed in each case.

Adding the cases gleaned from the files to the current cases, thirty-four examples of pigmented villonodular synovitis have been accumulated, including a recent typical diffuse lesion of the shoulder. The distribution is indicated in the table. The lesions in eighteen of the thirty-four cases were on the right side, sixteen being on the left. All thirty-two lesions involving joints were monarticular in nature.

The average age of all patients was 38.5 years. The age range in the patients who had diffuse articular disease was from sixteen to sixty years; six of these twenty-eight were included in each of the third, fourth and sixth decades of life and eight were found in the fifth decade. The ages of those who had focal lesions ranged from twenty to fifty-nine, and the two patients who had bursal disease were twenty-three and forty-six years of age, respectively.

TABLE 1. PIGMENTED VILLONODULAR SYNOVITIS: DISTRIBUTION OF ARTICULAR LESIONS*

Location	Type of Lesion		
	Diffuse	Focal	Total Cases
Knee	20	3	23
Hip	5	1	6
Ankle	2	—	2
Shoulder	1	—	1
Total	28	4	32

*Excludes the two lesions confined to popliteal bursae.

The entire group showed a female sex preponderance of 23:11. In the patients with diffuse articular lesions, this ratio was 19:9.

Symptoms.—The average duration of symptoms before the patients came to the clinic was six and one-half years; the shortest period was six months and the longest was twenty-five years. Four patients had had surgical exploration elsewhere without definitive treatment. In two of these, popliteal bursae filled with pigmented villonodular lesions had been excised and similarly diseased knee joints with which they communicated had not been treated. Another, with no recognizable joint lesion, had undergone removal of the diseased popliteal bursa.

Pain was a complaint given by all thirty-four patients. The pain was severe and often incapacitating during periods of exacerbation of swelling, but generally it persisted as a dull ache between such episodes. Only four patients complained of pain in other than the involved joint. One of these had a punch biopsy of the opposite knee that revealed no pathologic changes, and another (the patient with the lesion of the shoulder) had a traumatic lesion of the other shoulder that explained the pain in the latter.

Swelling had not been noted by any of the patients who had lesions of the hip or shoulder. In contrast, all but one of those who had involvement of the knee or ankle mentioned this symptom, which had been noted at the onset of clinical symptoms in most instances. This swelling was intermittent and recurrent in fifteen patients, but progressive enlargement was present in twelve. Of the group with intermittent effusion, nine had undergone aspiration of the joint prior to treatment at the clinic. Three of these patients stated that the fluid had been hemorrhagic and two called it straw-colored.

Limitation of motion was a complaint in about

half of this series. Three patients described recurrent "locking" of the involved joint.

Histories of trauma preceding the onset of symptoms were elicited from nearly half the patients.



Fig. 1. Roentgenogram of the pelvis demonstrating cystic changes in the head of the femur and the acetabulum in pigmented villonodular synovitis of the right hip.

Examination.—Tenderness on palpation of the involved joint was present in half the patients. Limitation of motion, ordinarily minimal, but severe in a few, was recorded in twenty-one instances. Swelling of the affected joint was associated with all but one of the diffuse lesions of the knee or ankle; it was extremely prominent in several. This swelling was considered to be due to or associated with effusion in eleven patients. Focal masses in and about the joints were palpated in six patients. Enlargement of the suprapatellar pouch was observed commonly.

Roentgenographic examination gave positive results in two thirds of the diffuse lesions of the knee or ankle. Soft-tissue masses, sometimes nodular, were noted in thirteen of these twenty-two patients. Seven had cystlike rarefied foci measuring up to 2 cm. in diameter in the ends of the adjacent bones, two showed some irregularity of the bony cortex near the knee and one had only osteoporosis. All five patients with diffuse disease of the hip joint had cystic changes in their femoral heads and acetabula, along with other stigmas suggestive of degenerative joint disease of variable severity (Fig. 1). Two of the focal lesions of the knee produced soft-tissue masses visible roentgeno-

graphically, as did the lesion of the popliteal bursa that had not been excised.

Determinations of blood cholesterol, cholesterol esters, lecithin and fatty acids were done on five patients; all values were normal.

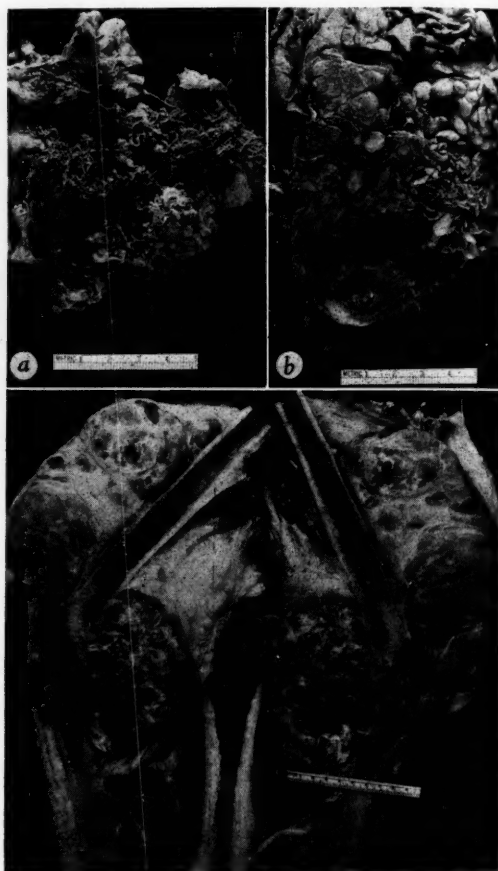


Fig. 2. (above) (a) Specimen from knee consisting mainly of shaggy villi, with minimal formation of nodules. (b) Lesion from knee demonstrating both villi and nodules.

Fig. 3. (below) Villonodular synovitis with pronounced tumefaction of the entire region of the knee joint, including the suprapatellar pouch. Because of severe destruction of the joint, amputation was considered the treatment of choice.

Gross Pathologic Appearance

A specimen obtained by punch biopsy through a trocar was the only tissue obtained from one patient. These brown shaggy fragments were accompanied by an excess of brown synovial fluid, such as was described in eleven of the surgically treated patients. Diffuse involvement of the joint

in this patient was evident from the clinical features.

The pathologic process involved the synovium diffusely in twenty-seven of the patients treated surgically. The lesions in four patients were focal, with tan to dark-brown circumscribed masses varying from 2 to 13 cm. in diameter and projecting into the joint. Three of these focal tumors, unlike xanthomas of tendon sheaths, were spongelike, as though from partial fusion of villi. The largest lesion in this group filled a suprapatellar pouch. The uninvolved synovium in these patients appeared perfectly normal. The knee joint was the site of three focal tumors, and one was found in the hip.

The twenty-eight diffuse lesions included six in which there was extremely shaggy villous involvement, with only small nodules or none (Fig. 2a). The lesions in four of this group of twenty-eight patients were mainly nodular, with firm masses varying from 1 to 14 cm. in diameter and with thickening of the intervening synovium up to 2.5 cm. (Fig. 2b). The color varied from reddish brown to brownish black and many lesions had prominent yellow zones. The remaining lesions were both villous and nodular, with spongy regions of fused villi. Several of them contained small islands of normal-appearing synovium. One particularly remarkable specimen showed the entire region of the knee joint to be the site of a practically solid tumor measuring 30 by 20 by 20 cm. that had caused considerable destruction of the ends of the adjacent bones (Fig. 3). As already indicated, there were two instances in which popliteal bursae communicated with the knee joints and were affected by the same disease.

The other two lesions of the popliteal bursae showed diffuse villonodular disease similar to that noted in many of the articular lesions. In neither of these was there evidence of involvement of the knee joint itself.

Histopathologic Features

Microscopic study revealed a variety of characteristic changes. The most striking feature, in the average case, was hyperplasia of the synovial lining and stromal cells. This resulted in thickening of the lining layer and the production of thin or thick villous projections, with apparent penetration of these proliferating cells into the synovial connective tissue.

The villous projections ordinarily possessed cores of vascular connective tissue. These prominent synovial cells contained brownish pigment in every instance, although in some it was present in focal zones only. Special stains showed the brown

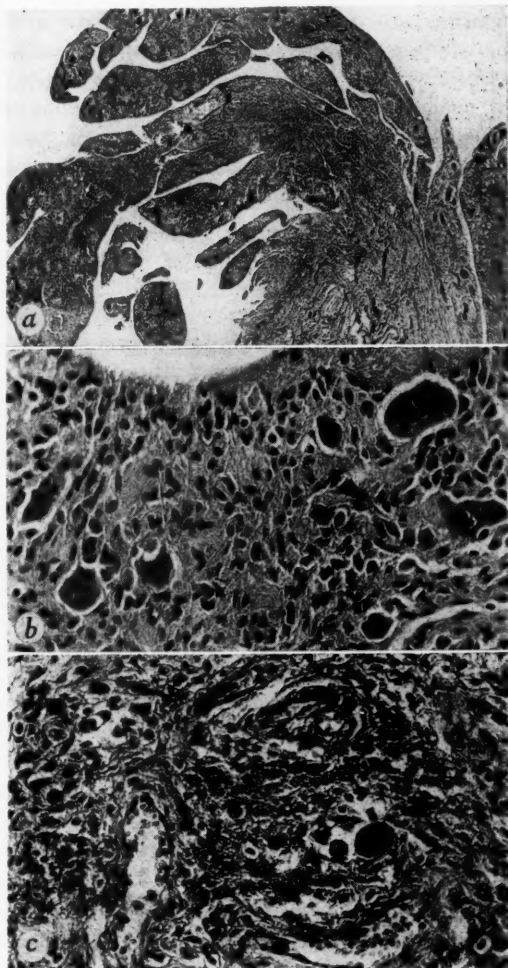


Fig. 4. (a) Villous formation and fusion of villi, with production of synovial-lined clefts (hematoxylin and eosin; x30). (b) Edge of a villous projection illustrating proliferating stromal and synovial cells and benign multinucleated cells (hematoxylin and eosin; x300). (c) Mass of synovial cells that are granular owing to the presence of hemosiderin (hematoxylin and eosin; x300).

pigment to be iron. Mitotic figures, present in every lesion and sometimes rather numerous, attested to the active proliferation of these cells. Occasional to fairly numerous multinucleated cells were found.

As the lesions progressed in severity, fusion of

these villous projections occurred, often producing prominent clefts lined by synovial cells (Fig. 4a). These clefts were present in every case and, when extensive, were the histologic counterpart of the spongy regions observed grossly. Solid zones with few or no residual clefts were seen in what appeared to be still older portions. These solid nodules were indistinguishable grossly or microscopically from xanthomas (benign synoviomias) of tendon sheaths. Their histologic components were proliferating synovial cells, benign multinucleated cells and cells containing variable amounts of iron or lipides, with occasional large hyalinized areas.

Lipides within isolated cells or sheets of cells were found in every lesion. When extensive, their presence produced grossly yellow zones. These lipide-containing cells were found commonly in the deeper portions of the synovial connective tissue. It was frequently impossible to decide whether the lipide-laden foam cells were basically synovial lining cells or histiocytic elements. Sheets of foam cells constituted a fourth or more of the histologic material studied in 75 per cent of the cases.

Multinucleated benign giant cells were present in every specimen (Fig. 4b). These ordinarily contained from eight to ten or more nuclei. They were found in both villous and nodular zones.

Iron pigment within cells also was found in every case (Fig. 4c). It was impossible at times to decide that the hemosiderin-containing cells were not histiocytes. To check the concept that extensive pigmentation is a feature of older lesions, the amount of iron found was correlated with the preoperative duration of symptoms. It was found that patients with extensive deposits of iron had experienced symptoms for an average of eight years, as opposed to an average of four years for those with less iron.

Cells usually associated with inflammatory changes were conspicuous by their paucity in these lesions. Occasional lymphocytes were seen in some areas. In only one instance were there focal and diffuse collections of lymphocytes to a degree comparable to that seen in rheumatoid synovitis.

Material from the adjacent cystic defects in the bones of a nearby joint was available for study in several cases. In none of these was the tissue from this source like the synovial lesion; rather, it consisted merely of myxomatous fibrous tissue of

the type obtained from similar cysts in ordinary degenerative disease of joints. Furthermore, some of the cysts had no obvious communication with the joint space.

Treatment and Results

All four of the patients with focal lesions and one of the patients with a lesion of the popliteal bursa have remained well for periods varying from eight to thirty-four years after surgical excision. The other diseased popliteal bursa was removed one year ago.

The five patients who had diffuse lesions of the hip were treated by removal of as much of the diseased synovium as possible, followed by insertion of vitallium cups. Three had adjunctive roentgen therapy. These five were treated rather recently and have been followed for periods varying from six months to three and one-half years. Three have had good results, whereas two have considerable limp. These follow-up periods are, of course, inadequate for final appraisal. To date, there is no appreciable difference in results between the irradiated and the nonirradiated patients.

Eighteen of the patients who had diffuse lesions of the knee joint were treated with subtotal synovectomy, which consisted of removal of as much of the synovium as was deemed surgically feasible. Follow-up information for more than two years is available in only ten of these. Half of the ten had irradiation therapy in addition to excision. No significant differences are apparent in the long-term results from the two forms of treatment in these small groups. Recurrence has been proved in three of the ten patients and several others have some stiffness.

Results in the two patients who had diffuse lesions of the ankle likewise shed little light on the problem of correct management. One had subtotal removal and roentgen therapy that was repeated a year later because of persistent disease; he then was lost to follow-up. The other had excision of the bulk of the diseased tissue, followed by two courses of radium treatment. He received roentgen therapy three years later after excision of a recurrent lesion. Although the progress of the disease was arrested, amputation became necessary seven years after the second operation because of damage from the irradiation.

The lesion in the shoulder was recently excised,

along with repair of a torn musculotendinous shoulder cuff. Apparently, it was merely an incidental finding despite its typical gross and microscopic features. The result was good eight months after operation.

Comment

The pronounced predilection displayed by pigmented villonodular synovitis for the lower extremities, especially the knee joint, was further emphasized by this study. As already indicated, however, a typical example of this disease was discovered just prior to completion of this review, as an incidental finding in the shoulder of a patient. Thorough perusal of the files on lesions of the upper extremity possibly might uncover more cases. We were unable to discover why this lesion generally is limited to the lower extremity. Trauma was noted by nearly half the patients but, inasmuch as a history of notable injury generally is obtained readily in disease of the joints and extremities, it appears that trauma was an incidental episode in these instances.

Sections of synovium taken from three knee joints containing hemorrhagic fluid after trauma were seen in the course of this study. The synovium in these instances contained hemosiderin in the lining cells and underlying histiocytes but failed to show any of the other features of pigmented villonodular synovitis. This series lent no positive support to the view that the disease is caused by intra-articular hemorrhage. Furthermore, none of these patients gave evidence of any blood dyscrasia. It has been shown that hemochromatosis gives brownish pigmentation of the synovial lining not associated with the other features of pigmented villonodular synovitis.¹⁸

As indicated before, Fisk¹⁴ mentioned the possibility of so-called idiopathic intermittent hydrarthrosis as a precursor of pigmented villonodular synovitis. One third of our patients gave a history of recurrent effusion in the involved joint prior to operation, but it is impossible to determine any cause-and-effect relationship.

Some investigators have considered rheumatoid arthritis to be a precursor of pigmented villonodular synovitis. One of our patients had an inflammatory component suggestive of rheumatoid synovitis but, with this single exception, the study indicated no transition between these two diseases. Because the cases were selected for study on the basis of suggestive pathologic reports on file,

numerous villous rheumatoid synovial membranes were studied. It appears unlikely that transitional phases between these two entities could have been overlooked if they occur.

The impression gained from the literature is that disordered metabolism of fat plays no significant role in this disease. Only five of the patients in this series had determinations of blood lipides, all of which were normal.

The question of whether pigmented villonodular synovitis represents a peculiar type of synovial neoplasm is as yet unanswered. Features suggesting that the lesion may be neoplastic include the following: In each of these patients, the disease was progressive until treatment was instituted. The nodules formed are identical to xanthomas of tendon sheaths, which some observers consider to be benign synoviomias. The large size that may be attained by these lesions in the absence of a significant inflammatory component is difficult to explain on a non-neoplastic basis. Furthermore, no infectious agent has been implicated.

Lewis¹⁹ has listed criteria for the roentgenologic diagnosis of pigmented villonodular synovitis. These include (1) bones of a young adult, (2) monarticular involvement, (3) an excessive amount of synovitis, which may appear smooth in outline but which is particularly diagnostic when it is, in part at least, nodular in outline and density, (4) no indication of abnormalities of cartilage and (5) completely normal-appearing bones. This last criterion is frequently invalid, as evidenced by the number of lesions in this series in which cystic defects adjacent to the joints were seen. In fact, such cysts were observed in all the patients who had diffuse disease of the hip joint.

Aspiration of synovium for biopsy confirmed the diagnosis of pigmented villonodular synovitis in four cases in this series. These specimens were procured by the technique for punch biopsy described by Polley and Bickel.²⁰ In patients in whom the disease is focal and even in some of those with diffuse involvement, a specimen procured blindly through a trocar could fail to give unequivocal histologic proof of this disease; however, a diagnostic specimen should be obtained in most of the diffuse lesions of knee joints.

Histologic studies in this series revealed no new features. None of the lesions underwent malignant transformation. Mitotic activity may be prominent in parts of these lesions but an erron-

eous diagnosis of a malignant lesion, such as synovial sarcoma, can be avoided readily. The combination of iron-containing cells, lipide-containing cells and benign, multinucleated cells labels this condition benign as accurately as it does in the case of xanthomas of tendon sheaths.

The two examples of pigmented villonodular bursitis re-emphasize the fact that this peculiar lesion can occur apart from joints.

The best treatment of diffuse pigmented villonodular synovitis is still debatable. Synovectomy frequently gives prolonged benefit but recurrence is not uncommon; recurrent lesions appeared after five years in two of our patients. Roentgen therapy has been advocated by some workers.^{12,19} Our observations certainly do not justify a dogmatic stand but we are of the opinion that as complete surgical extirpation as possible should be attempted. Postoperative irradiation therapy may be advisable, especially in the management of recurrent lesions. Since no lesion in this series nor in the literature has pursued a malignant course, treatment is never an emergency procedure.

Summary and Conclusions

A series of thirty-four cases of pigmented villonodular synovitis has been studied at the Mayo Clinic.

Pigmented villonodular synovitis is a relatively rare disorder of unknown cause and nature. Without completely settling the issue, this study lends support to the theory that the lesion is neoplastic or at least can assume the proportions of a neoplasm.

These observations emphasize the histologic kinship of the diffuse and focal synovial lesions, as well as pigmented villonodular bursitis and "xanthomas," or "benign synoviomas," of tendon sheaths.

Study of this series and of reported cases indicates that further evaluation and follow-up data are necessary to determine the best treatment or combination of treatments for the diffuse form of pigmented villonodular synovitis.

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Present Concept of the Treatment of Arteriosclerosis Obliterans

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ARTERIOSCLEROSIS obliterans is a term used to designate a chronic occlusive arterial disease of the extremities occurring as a manifestation of atherosclerosis. The syndrome of arteriosclerosis obliterans becomes manifest as a result of ischemia of tissues owing to interference with the flow of blood through the main peripheral arteries. The treatment of this syndrome is complex because of its numerous clinical manifestations and the lack of knowledge concerning its cause. The principles of therapy might be stated thus: (1) arrest the progress of the disease, (2) attempt to increase blood flow in the ischemic tissues and (3) provide symptomatic relief.

Arrest Progress of Disease

To arrest the progress of arteriosclerosis obliterans would require knowledge as to the cause of atherosclerosis. At present, knowledge of this is too incomplete to provide an exact therapeutic regimen. Because of the obvious implication of abnormal metabolism of fat in the development of atherosclerosis, several therapeutic measures have been aimed at correction of this defect. These include, either singly or in combination, the provision of a diet low in fat content and the administration of lipotropic substances (inositol, choline), estrogens, thyroid extract, heparin, or iodine, to mention only a few. To summarize this complicated problem briefly, it is my opinion that there is no treatment that has been demonstrated to have a consistent effect in arresting the progress of atherosclerosis. One should discuss briefly and simply with patients afflicted with arteriosclerosis obliterans (and particularly when it is associated with hyperlipemia) the apparent relationship of fat metabolism and atherosclerosis. Thus, the pa-

tient may participate in any decision as to treatment with a diet low in fat content or with drugs.

It has been shown conclusively that the quantity of nicotine in a cigaret produces vasoconstriction of the arteries supplying the skin and thereby results in decrease of blood flow and skin temperature. This vasoconstriction is likely to be harmful in ischemic extremities. Ordinarily, I urge patients with severe ischemia to discontinue the use of tobacco. However, in patients with only mild ischemia I merely discuss the role of tobacco in further decreasing their circulation, emphasize the medical reasons for discontinuing the use of tobacco and leave the decision on the use of tobacco to the patient. One must utilize a certain philosophic approach to this problem, for many times the complete discontinuance of the use of tobacco represents a hardship and loss of pleasure to an elderly person with minimal if any resultant medical benefit.

Control of trichophytosis is important, because this condition frequently causes interdigital fissures which may lead to cellulitis and gangrene. Ordinarily, soaking the feet in a 1:9,000 solution of potassium permanganate for 15 minutes twice daily is successful in eradicating trichophytosis in 5 to 10 days. After this has been accomplished, it is wise to suggest the daily use of a foot powder such as zincundecate (desenex) as a prophylactic measure.

Appropriate control of diabetes, when present, is important, for this measure aids indirectly in the healing of ulcers and in maintaining resistance to local infections.

Theoretically, long-term use of anticoagulant drugs should be beneficial in preventing the thrombosis of chronic occlusive arterial diseases. However, this treatment usually is not practicable because of the risk of hemorrhage, the need for adequate laboratory control of prothrombin time, the cost to the patient and the need for treatment to be continued over many months or years.

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Attempt to Increase Blood Flow

Attempts to increase blood flow in ischemic extremities have been numerous and varied in type. My colleagues and I have not found postural exercises and the use of suction or pressure apparatuses sufficiently beneficial to warrant their use. The Sanders oscillating bed seems moderately helpful in increasing blood flow to the feet, relieving ischemic neuritis and inducing sleep. However, the use of such a bed is ordinarily confined to a hospital, although a few of our patients have purchased one for home use.

A warm environmental temperature is helpful in producing vasodilatation of the skin. Vasodilatation may be obtained by keeping the temperature of the patient's room between 85° and 90° F. My colleagues and I have also used a wooden box, placed at the foot of the bed, into which are placed the patient's lower extremities. The temperature in this box is kept thermostatically between 85° and 90° F. Contrast baths have been used in the past, but I prefer not to use these because of the possibility of trauma from excessive heat or cold. Also, whatever vasodilatation is produced by contrast baths is very transient.

One to two ounces of alcohol given three or four times a day produces transient vasodilatation, some sedative effect and mild euphoria. It should be remembered, however, that the effect is transient and that some people cannot tolerate alcohol. I hesitate to advise the regular use of alcohol over a period of weeks or months for fear of inducing a state of chronic alcoholism. At times, alcohol may be given intravenously as a 5 per cent solution, the rate of infusion being regulated by the effect on the patient.

"Vasodilating" drugs such as 3-pyridinemethanol (roniacol), benzazoline (priscoline), hydrogenated ergot alkaloids (hydergine), hexamethonium bromide (bistrum) and pentolinium tartrate (ansolysen), for example, have been advocated for the treatment of arteriosclerosis obliterans. Our experience has been that "vasodilating" drugs have not been significantly effective in increasing arterial blood flow in extremities that are ischemic owing to arteriosclerosis obliterans. Theoretically, the effectiveness of such drugs depends upon the capacity of the peripheral arteries to dilate. If a prominent vasospastic element is present, such drugs may be partially beneficial in reducing vaso-

spasm, but this situation rarely is a significant factor in arteriosclerosis obliterans.

Lumbar sympathectomy is used at times in arteriosclerosis obliterans to increase the flow of blood through the skin. Such an increase occurs as a result of vasodilatation of the small arteries that supply the skin. Lumbar sympathectomy provides maximal "permanent" vasodilatation. It does not arrest the disease process that is causing arterial occlusion, nor does it open arteries that are organically occluded.

A bilateral, abdominal, extraperitoneal approach may be used in which some or all of the first four lumbar ganglia are excised. Ordinarily, the second and third lumbar ganglia are the ones excised, but if the first and fourth are visible in the incision they also are removed. When both second lumbar ganglia are removed, approximately half of the men so treated will be sterile. This occurs as a result of loss of ejaculatory power. Some of the men so affected regain the power of ejaculation after several weeks or months. Whether unilateral or bilateral lumbar sympathectomy is performed depends upon whether the occlusive arterial disease is unilateral or bilateral. Also, in some instances in which it is desirable to avoid sterility, unilateral lumbar sympathectomy is advisable.

There are no exact criteria for selection of patients for lumbar sympathectomy. In general, persons who are less than 60 to 65 years of age (and that is more or less an arbitrary figure), who have little or no gangrene and who seem clinically to have the potential for vasodilatation may be considered to be suitable candidates for the operation. One aid in selection of patients is to determine whether the skin temperature of the toes can be increased under conditions of vasodilatation. The vasodilatation is preferably induced by a room environmental temperature of 90° F., but may also be induced by ingestion of alcohol or by a lumbar sympathetic block with piperocaine (metycaine).

In general, neurosurgeons perform lumbar sympathectomy more often in younger than in older patients, in those without gangrene (unless very minor) and in those in whom the capacity for vasodilatation can be demonstrated. My colleagues and I do not advise sympathectomy in the presence of extensive ulcerations or gangrene in which amputation is likely to be necessary. Sym-

pathectomy in such circumstances is ordinarily a needless operation.

In recent years, surgeons have attempted to produce chemical sympathectomy by injecting the lumbar ganglia with absolute alcohol. We do not feel that this procedure is adequate replacement for surgical excision of ganglia, because the effect is inconstant and transient in some instances. However, chemical sympathectomy may be used when surgical sympathectomy is not advisable, as in advanced age or in the presence of a disease that makes the surgical risk excessive.

Improved surgical techniques have led to attempts at improving blood flow to ischemic limbs by means of blood-vessel grafts. Initially, simple resection of the diseased segment of artery was performed. Some patients have demonstrated return of pulsations in the foot and decrease in severity of symptoms following such treatment. However, this form of therapy has not been uniformly successful. Resection of the diseased arterial segment in conjunction with placement of a vessel graft to replace the diseased segment and to provide continuity of the vessel has also been attempted. Types of grafts include homografts with vein or artery, and prosthetic grafts of nylon, orlon or ivalon. Vein grafts seem to be the least desirable because of a tendency to rupture or aneurysm formation. It is too early to evaluate completely arterial or prosthetic grafts but experience with both of these has been very encouraging. The beneficial results of grafting include restoration of the continuity of major vessels and pulsatile blood flow plus relief of symptoms. Most of these grafts remain patent and have not been associated with hemorrhage or aneurysm formation. This new surgical approach to the treatment of *segmental* arterial occlusion seems to represent a major advance in the treatment of arteriosclerosis obliterans. However, final evaluation of its efficacy must await statistical study of such surgically treated patients over a period of several years.

Relieve Symptoms

Symptomatic treatment of patients with arteriosclerosis obliterans requires the use of diverse therapeutic agents. A deproteinized extract of pancreatic tissue (depropanex) has been used in the treatment of claudication. Roughly, 50 per cent of patients treated with this substance feel that they obtain some improvement. Objective proof of

this is lacking. This form of therapy may be justifiable occasionally, although I personally doubt its effectiveness. The dosage is empiric—5 cc. given intramuscularly each day for one week and then 5 cc. given intramuscularly three times a week for two weeks, two times a week for two weeks and once a week for two weeks. If the patient considers that claudication is decreased, the entire course may be repeated after a six-week interval.

Other drugs that have been used for claudication are curare, mephenesin (tolserol), heparin, testosterone and nicotinic acid, but they have been of no significant benefit in our experience. Achilles tenotomy has been advocated for relief of claudication, but this has not been universally accepted. Bilateral tenotomy results in a shuffling gait and requires re-education in walking.

Relief of pain of ischemic neuropathy may be difficult. One should use the simplest drugs first, such as barbiturates, aspirin and codeine. Often, however, it becomes necessary to use opiates such as morphine or meperidine (demerol). Physicians must be extremely cautious to avoid addiction in such patients. Rarely, in cases in which it is not possible to relieve a severe, chronic ischemic pain amputation is justifiable.

The rôle of trauma in the causation of ulceration and gangrene cannot be overemphasized, and patients with ischemic extremities must be instructed as to the care of their feet. They should be cautioned to wear well-fitting hose and shoes, and to avoid all forms of trauma (thermal, chemical, cutting, bruising and so forth). Corns and calluses should be cared for by a physician or a well-trained chiropodist who is aware of the problem of ischemic feet. Toenails should be cut squarely and ingrown nails treated by a physician or chiropodist. Fungous infections must be controlled.

Ulceration and gangrene require rest in bed. The area to be treated may be cleansed by using wet boric acid packs continuously. A 0.5 per cent solution of aluminum subacetate is helpful for pruritic lesions. Dilute acetic acid is particularly beneficial in ulcers infected by *Pseudomonas* organisms. Wet tyrothricin packs are also helpful in some instances in which the infection of the ulcer is resistant to other measures.

(Continued on Page 207)

Suction Drainage for the Prevention of Dead Space in Surgical Wounds

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FUNDAMENTAL surgical principles indict dead space as an obstacle to healing. Accordingly, surgeons have made special efforts to prevent serosanguinous accumulations consequent to the leaving of unfilled spaces in the depths of wounds. The thoracic surgeon knows that the best prevention of empyema after thoracotomy is full expansion of the lung to fill the chest. The plastic surgeon lays as much emphasis on a good pressure dressing as on the surgical procedure proper. He soon becomes fully aware of the frequent difficulty in keeping the pressure uniformly and accurately applied despite irregular contours and motion. The general surgeon has frequent occasion to create extensive wounds which have potential spaces for the accumulation of blood and exudate. Of especial note are the operations of radical mastectomy, block dissection of the neck, radical inguinal dissection, and ventral hernioplasty. Extensive flaps are elevated and finally replaced over raw surfaces which may ooze both blood and lymph. Should the potential space become filled with these fluids, infection and delayed healing are to be expected; prevention of such accumulation, although difficult, is the only road to primary healing. The purpose of this paper is to call attention to a simple technique to accomplish this end.

The principles of the procedure are to provide active external siphonage of fluid accumulations and to substitute atmospheric pressure for pressure dressings. All that need be done is to make the wound airtight and to drain the potential dead space under the flaps into a system having a pressure less than atmospheric.

After operative dissection, hemostasis, and repair in the usual fashion, a tiny stab wound is made at an appropriate point in the skin. Through it is passed a tight-fitting catheter having multiple perforations in its distal end. The catheter is placed under the flap in position to be maximally

effective in the removal of fluid and air. One or more catheters may be used. The wound is now closed in the usual manner by any simple stitch. The closure of the space under the flaps should now be airtight. The wound is dressed lightly with collodion or aeroplast in order further to prevent leakage of air. The catheter or catheters are connected to sterile suction apparatus; a negative pressure of about five pounds per square inch is applied. At once the air and fluid under the flaps will be extracted; the flaps will be seen closely to conform to the underlying tissues, however irregular they may be. Suction is continued either by an electric pump or by the Wangenstein apparatus for a period of forty-eight to ninety-six hours. After this period of time, the returns will be minimal, the flaps will be adherent to their subvirons, and the catheter will be plugged with fibrin. At this time it can be removed.

A light dressing is now desirable until healing is completed. We have found that such dressings after radical mastectomy can be easily and comfortably held in place, without adhesive, by the wearing of a Muller chest binder.

We have been eminently satisfied with this technique after radical mastectomy. The bulky and expensive pressure dressing is entirely done away with, along with its odor. Flaps become promptly and securely attached to underlying tissues, even in the apex of the axilla. Healing is improved. Arm motion is regained earlier and more easily. Patients are ready to leave the hospital three to five days sooner than with prior techniques. We have had two patients subjected to a second radical mastectomy; both patients vastly preferred the suction technique.

There have been no ill effects noted from the application of negative pressure to wounds. Circulation has not been interfered with. Infection has been no problem.

The idea of suction-drainage is not original with

us. In 1952, Raffi⁵ described, after radical mastectomy, the use of a catheter passing from the potential dead space to a suction device. Koontz⁴ used and described a similar technique in extensive ventral hernioplasty. The present authors became aware of the technique as it was employed at the U. S. Naval Hospital, Oakland, California, with very successful results, by Capt. Richard S. Silvis, U.S.N. Other favorable experiences have been reported.^{1,2,3,7}

It should be specifically pointed out that these techniques differ from the simple application of suction to a drainage tube, especially a sump drain or a drain supplied with an air vent. In suction-drainage, the wound is made airtight. Because of the negative pressure thus created, complete removal of fluid drainage is secured; formation of further fluid is minimized by the uniform pressure of the atmosphere on the flaps; and primary healing of the approximated surfaces of tissue is promoted.

Summary

On the basis of our experience to date, we feel that suction-drainage of an airtight wound is the definitive technique for obliterating dead spaces in extensive surgical wounds.

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PRESENT CONCEPT OF THE TREATMENT OF ARTERIOSCLEROSIS OBLITERANS

(Continued from Page 205)

It is suggested that the simplest measures be tried first. Application of any substance that might cause chemical necrosis is to be avoided. When the base of the ulcer is clean, a powder of dried erythrocytes may be sprinkled over the ulcer. After three to seven days, this may be soaked off and new powder applied. We have found this to be quite beneficial in some instances.

The use of a combination of streptokinase and streptodornase (varidase) has been found recently to be successful in producing a clean base of granulation tissue. The parenteral or oral administration of antibiotic drugs is frequently indicated for control of infection in the tissues surrounding the ulcer or the site of gangrene.

When therapeutic measures fail to heal the ulcer, amputation may become necessary. Before resorting to this, all conservative measures should be tried, if there seems to be a reasonable chance for healing to occur. Amputation of a gangrenous

toe with subsequent healing of the amputation site is rarely possible in arteriosclerosis obliterans because of the severity of ischemia in this disease. The site of amputation (either "below knee" or "mid thigh") is determined by the level of the extremity at which circulation is sufficient to permit healing of the stump. Many tests have been devised to localize such levels, but usually the surgeon can tell best at the time of operation by the amount of bleeding present. For example, if there is minimal bleeding in a below-knee approach, the surgeon may feel it necessary to do a mid thigh amputation.

It is obvious from the above discussion that current therapeutic measures for arteriosclerosis obliterans are inadequate. The essence of the problem is that of the etiology of atherosclerosis. For when we learn to prevent atherosclerosis, its ischemic manifestations (arteriosclerosis obliterans) will no longer occur.

Minnesota Rheumatic Fever Survey, 1955

D. S. FLEMING, M.D., M.P.H.
F. J. HIRSCHBOECK, M.D.
J. A. COSGRIFF, M.D.

THE Minnesota rheumatic fever survey originated in 1953 when the Heart Committee of the Minnesota State Medical Association appointed a small group to prepare a brief questionnaire with the intention of learning from practicing physicians throughout the state how much of a problem rheumatic fever represented. The Minnesota Heart Association and the state health department participated in the project from its onset.

TABLE I. CASES OF RHEUMATIC FEVER REPORTED TO MINNESOTA DEPARTMENT OF HEALTH, 1944-1954

Year	Number of Cases
1944	0
1945	15
1946	82
1947	144
1948	120
1949	131
1950	162
1951	170
1952	221
1953	235
1954	148

Reasons for such a survey lay in the need for current information on rheumatic fever. In recent years a growing feeling has developed that rheumatic fever has been declining in incidence and prevalence and that the disease no longer is a serious problem. At the same time, newer methods of prevention and treatment have rapidly developed, deserving widespread adoption if the disease continues to be widespread. Because accurate current information as to the prevalence of the disease has been lacking, the Heart Committee undertook a statewide survey to provide some of this data.

In Table I is shown the number of cases of rheumatic fever reported to the state health department in Minnesota in the years since 1944 when the disease was made reportable. The cases

Dr. Fleming is director, Division of Disease Prevention and Control, Minnesota Department of Health. Dr. Hirschboeck is chairman, Heart Committee, Minnesota State Medical Association. Dr. Cosgriff is president, Minnesota Heart Association.

TABLE II. CASES OF RHEUMATIC FEVER REPORTED TO MINNESOTA DEPARTMENT OF HEALTH, 1953, 1954, BY SEX AND AGE GROUP

Age	1953			1954		
	Male	Female	Total	Male	Female	Total
Under 1						
1	1	1	2			
2		3	3			
3	1	3	4			
4	19	17	36	10	12	22
5-9	16	19	35	8	5	13
10-14	10	9	19	3	6	9
15-19	4	2	6			
20-24	9	3	12	2		2
25-29	6	3	9	10	2	12
30-34	6	3	9	2	2	4
35-39	3		3	5	1	6
40-44	3		3		2	2
45-49	3		3			
50-54		1	1	2		2
55-59			0		1	1
60-64	2		2		2	2
65 & over		1	1	1	3	4
Not stated	41	46	87	35	28	63
Total	124	111	235	84	64	148

reported in 1954 and 1953 are shown by age grouping and sex in Table II. Fifty-four per cent of the cases were in males. Of the 233 cases where age is given, 117 (50.2 per cent) were under the age of fifteen years. In these two years, 1953 and 1954, reported cases from fifty of the state's eighty-seven counties were recorded.

The plan of the survey was to send to every physician in the state a simple questionnaire for his completion and return in a stamped return address envelope (see reproduction of questionnaire). Negative replies were indicated as important as positive replies. A letter explaining the survey and type of data requested accompanied the questionnaire. The definition of a case of rheumatic fever for purposes of counting in the survey was the responsibility of each physician to decide. The survey was directed at rheumatic fever as the doctors working diagnosis, and was not limited to rheumatic heart disease.

The questionnaire and explanatory letter were sent on September 9, 1955, to all physicians whose names and addresses were currently available to the Minnesota State Medical Association as members of the association; this group included 200 life members and totaled 3,063 physicians. This

MINNESOTA RHEUMATIC FEVER SURVEY, 1955—FLEMING ET AL

To: Members of the Minnesota State Medical Association

Dear Doctor:

The Heart Committee and the Council of the Minnesota State Medical Association asks your co-operation in a statewide survey of the present-day problem of rheumatic fever. We want you to tell us, on the enclosed simple questionnaire, how extensive a problem this disease is to you in your own practice, so that we will have a better foundation for approaching it on a statewide basis.

Rheumatic fever is reportable to the State Board of Health in Minnesota but because of difficulty in defining what is a reportable case, such figures over the years are neither complete nor entirely accurate. Even so, 235 cases were reported in 1953, and 150 cases in 1954. There is an impression that rheumatic fever is declining and is not a serious problem in Minnesota, but we need more complete information before we can accept this.

For the purposes of this questionnaire we leave the definition of active rheumatic fever up to you as a physician. If you are treating someone for this diagnosis, please count it for your entry to query 1. The data should include all cases under your care in the previous twelve-month period. We did not intend, however, that this entry would include patients being treated only for decompensation, resulting from rheumatic heart disease of the past. If the rheumatic fever is still an active part of the condition, however, such a case should be counted. You can see the problem of definition.

In query 3, as to kind of prophylaxis, we had in mind whether you employ some of the following measures:

Continuous prophylaxis for some patients.

Intermittent prophylaxis for some patients, by special treatment of acute attacks of streptococcal disease.

Special provisions of prophylaxis for patients admitted to hospital where there may be increased hazards from streptococcal contacts.

Oral prophylaxis.

Intramuscular prophylaxis.

Type of drug employed, such as sulfonamide, penicillin, broad spectrum antibiotics, other.

Several of these entries could all be included in answering query 3.

Please fill in the questionnaire now and return it to us in the enclosed stamped return addressed envelopes.

group represents practically all physicians in Minnesota, whether practicing or not.

The response to the survey quickly became apparent as participation by physicians exceeded expected results. By December 1, a total of 1,556 questionnaires, 50.8 per cent of those sent out, had been returned. Of the total replies, 601 doctors, or 38.6 per cent, reported one or more cases of active rheumatic fever in the last twelve months; that is, a positive report to question 1. Four hundred and eighty-one (30.9 per cent) reported one or more cases of active rheumatic fever in children under fifteen years of age; and 649 (41.7 per cent) reported giving currently some form of prophylaxis to one or more individuals in their practice to prevent the development of rheumatic fever. It is apparent that participation in the survey was

If you have no patients in any of the categories listed, please tell us that, too. Negative answers are just as important to us as positive. Thank you very much for your prompt co-operation.

F. J. HIRSCHBOECK, M.D.

Chairman, Heart Committee

JAMES A. COSGRIFF, M.D.

President, Minnesota Heart Association

JOHN F. BRIGGS, M.D.

Member, Minnesota State Medical Association

QUESTIONNAIRE FOR RHEUMATIC FEVER SURVEY

(Date).....

To: All Physicians in Minnesota

Please complete the following queries and return this sheet to the Minnesota State Medical Association in the attached return address envelope.

1. How many patients in your practice are you now treating for active rheumatic fever in the past twelve months?
2. How many patients are under 15 years?
3. How many individuals in your practice are you now giving some form of prophylaxis to, to prevent the development of rheumatic fever?
4. What kind of prophylaxis are you using?.....

(Signed), M.D.

Address

County

Please check type of Practice:

Internist _____
Pediatrician _____
General _____
Surgeon _____
Other _____

Please answer at once.

not limited to those physicians reporting positive findings only, as negative reports constituted from 58 to 69 per cent of all replies received.

Participation likewise was surprisingly similar by physicians in all parts of the state. Over-all, 50.8 per cent of physicians replied to the questionnaire. When these replies are grouped by counties and compared to the number of physicians to whom the questionnaire was sent in each county, it is apparent that this same percentage participation existed with only slight variation through the entire state. Replies were received from physicians in every one of the eighty-seven counties in the state. The percentage response from the four counties with largest numbers of physicians queried is shown in Table III. These four counties, with 59.5 per cent of all physicians

MINNESOTA RHEUMATIC FEVER SURVEY, 1955—FLEMING ET AL

TABLE III. PARTICIPATION IN SURVEY BY PHYSICIANS IN HENNEPIN, RAMSEY, OLMSTED, AND ST. LOUIS COUNTIES

County	Number of Physicians Queried	Number of Replies	Per Cent Participation
Hennepin	864	476	55
Ramsey	438	210	48
Olmsted	370	142	38
St. Louis	152	106	69
Total	1824	934	51%

queried, returned 60.2 per cent of all replies received. It is apparent, therefore, that the survey results are not disproportionately weighted by the data furnished by physicians in metropolitan areas of the four counties listed above.

Thirty-seven replies, 2.3 per cent of the total, were received from physicians outside the state, whose names and addresses were on the mailing list as members of the Minnesota State Medical Association. These replies have been included in the data bearing upon participation by physicians in the survey but will not be included in data relating to the prevalence and incidence of the disease as reported in the state.

A further test of the validity of the survey findings lies in the participation by doctors carrying on various types of practice. Conceivably specialists in pediatrics, for example, might not have participated in the survey, while surgeons might have uniformly returned questionnaires. Table IV indicates the representation from various types of practices. Unfortunately no figures are available for the total number of doctors in Minnesota falling into the above types of practice, for comparison with the participation figures given. It does not seem unreasonable, however, to assume that roughly 4 per cent of all doctors practicing are pediatricians; 11 per cent, internists; and 45 per cent, general practitioners. If this is accepted, then the participation figures in the survey indicate that a representative sample of all practices responded to the questionnaire and that the data reported is safely acceptable from this standpoint.

The relatively large number of replies from physicians falling into the "other" category of practice, 440 (28.2 per cent) seemed somewhat unusual. As the individual replies were examined more closely, however, this impression lessened. Into the "other" category were placed replies from interns and residents, obstetricians, gynecologists, psychiatrists, urologists, eye, ear, nose, and throat specialists, allergists, proctologists, public health

physicians, pathologists, x-ray and radiology physicians, dermatologists, and several other categories of physicians who would not normally diagnose or treat rheumatic fever. It appears that almost 30 per cent of all physicians in the state have no

TABLE IV. PARTICIPATION IN SURVEY BY VARIOUS TYPES OF PRACTICES

Type of Practice	Number of Replies	Percentage of Total
Internist	173	11.1
Pediatrician	62	4.0
General	713	45.8
Surgeon	168	10.7
Other	440	28.2
Total	1556	99.8

particular chance of contact with patients with this disease. It may be that this fact has contributed to the impression among physicians that rheumatic fever is no longer a serious problem.

Data reported on the survey questionnaires, however, appear to show that rheumatic fever is currently a serious problem, both in terms of number of active cases, and in terms of number of persons receiving some type of prophylaxis. Replies from out of state physicians have not been included in the following data.

Fifteen hundred and nineteen physicians reported that they were currently treating, or in the last twelve months, had treated, as active rheumatic fever cases, a total of 2,297 patients. This represents a ratio of 1.51 patients for every reporting physician. When compared to the state's population, estimated for April 1, 1954, as 3,138,872, active rheumatic fever cases were reported at a rate of .73 per 1,000 population. Of the total, 2,297 cases reported, 1,434 (62.4 per cent) were indicated to be under fifteen years of age. When these cases are compared to the state's population under fifteen years of age, given as 823,899 in the 1950 federal census, and estimated in 1954 from school census figures as 934,032, active rheumatic fever cases under fifteen years of age were reported at a rate of 1.5 to 1.7 per 1,000 population.

Of the 1,519 physicians submitting replies, 597 (39.3 per cent) reported treating patients for active rheumatic fever. Their patients totaled 2,297 persons, an average of 3.8 cases for each physician reporting cases. When these figures are arranged by type of practice of the reporting physician, as in Table V, it is seen that pediatricians on the average report relatively more patients than do

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other physicians, with general practitioners and internists reporting about the same average number of patients. The figures for surgeons are perhaps too small to be reliable. Cases of rheumatic fever were reported from eighty-two of the eighty-

TABLE V. REPORTED CASES OF ACTIVE RHEUMATIC FEVER, ALL AGES, BY TYPE OF PRACTICE

Type of Practice	Questionnaires Returned	No. of Positive Replies	Number of Cases	Average	Per Cent of Total
Internist	173	73	258	3.5	11.2
Pediatrician	62	45	242	5.3	10.5
General	707	456	1725	3.8	75.0
Surgeon	166	12	48	4.0	2.0
Other	411	11	24	2.1	1.0
Total	1519	597	2297	3.8	91.7

seven counties in the state. The five counties not reporting cases, Cook, Dodge, Kanabec, Lac Qui Parle, and Red Lake, are rural areas not heavily populated. One reply was received from each of four counties, and two physicians reported from the fifth county.

In comparing the numbers of cases reported from various counties, there do not seem to be great differences in the over-all rate from one area to the next. Because only a fraction of the physicians in the state responded to the survey, although this fraction is 50.8 per cent, it is unwise to expect that individual county reports of cases would give reliable rates of the incidence of rheumatic fever in single counties. In such instances, with low county population figures, the presence or absence of a report from one physician in the county would greatly influence the apparent rate. When counties are grouped together, however, into population units of approximately 250,000 and by location in the state, comparative rates of reported cases can be calculated with improved usefulness. Table VI shows this data for groups of counties comprising the eight District Health Units of the state health department.

Earlier figures have shown that a considerable number of physicians in all types of practice responded to the survey. Inevitably, general practitioners comprised the largest number of the total, 45.8 per cent, with "others" next, 28.2 per cent, internists and surgeons equally represented, 11.1 and 10.7 per cent, respectively, and pediatricians the smallest group, 4.0 per cent. These figures indicate the participation by physicians in the survey and result from the natural distribution of physicians in various types of practices. When

TABLE VI. REPORTED CASES OF RHEUMATIC FEVER, RATE PER 1,000 POPULATION BY DISTRICTS

District	Headquarters	1954 Estimated Population	Number of Cases	Rate per 1,000 Population
I	Bemidji	227,164	141	0.62
II	Mankato	269,976	273	1.01
III	Rochester	329,853	238	0.72
IV	Duluth	285,438	159	0.55
V	Worthington	227,423	184	0.81
VI	Minneapolis	1,308,909	944	0.72
VII	Fergus Falls	220,812	143	0.64
VIII	Little Falls	269,297	215	0.79
Total		3,138,872	2297	0.73

Counties in District I: Beltrami, Cass, Clearwater, Hubbard, Itasca, Kittson, Koochiching, Lake of the Woods, Mahanomen, Marshall, Pennington, Polk, Red Lake, Roseau; District II: Blue Earth, Brown, Carver, Faribault, Le Sueur, Martin, McLeod, Nicollet, Scott, Sibley, Waseca, Watonwan; District III: Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona; District IV: Aitkin, Carlton, Cook, Lake, Pine, St. Louis; District V: Chippewa, Cottonwood, Jackson, Lac qui Parle, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood, Renville, Rock, Yellow Medicine; District VI: Anoka, Chisago, Dakota, Hennepin, Isanti, Kanabec, Ramsey, Washington, Wright; District VII: Becker, Big Stone, Clay, Douglas, Grant, Norman, Ottertail, Pope, Stevens, Swift, Traverse, Wilkin; District VIII: Benton, Crow Wing, Kandiyohi, Meeker, Mille Lacs, Morrison, Sherburne, Stearns, Todd, Wadena.

the reported cases of active rheumatic fever are examined in terms of the various types of practice, however, quite different percentages are found. Again, the highest percentage of cases are reported from doctors in general practice, 75.0 per cent. Internists and pediatricians, both specialist types of practice, report equal percentage of cases, 11.2 and 10.5 per cent. Surgeons and others report only 2.0 and 1.0 per cent of cases, as might be expected.

Not all general practitioners, internists, and pediatricians, who returned questionnaires, report treating cases of active rheumatic fever during the past twelve months. This was more frequently true in replies from internists, 57.9 per cent reporting no cases, than in general practitioners, 35.4 per cent, and pediatricians, 27.5 per cent, of whom reported no cases.

When the replies to the second question are considered, some expected differences appear. This question asked for the number of patients under fifteen years of age treated for active rheumatic fever currently or during the past twelve months. The 1,519 physicians returning questionnaires reported a total of 1,434 cases of rheumatic fever in children under fifteen years of age. These cases were reported by only 478 (31.4 per cent) of the total physicians reporting, and represent an average of 3.0 cases for each case-reporting doctor.

Arranging these cases by type of practice of the reporting physician as in Table VII, it is apparent that the average number of cases occurring in children is greatest for pediatricians, with gen-

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TABLE VII. REPORTED CASES OF ACTIVE RHEUMATIC FEVER UNDER 15 YEARS OF AGE, BY TYPE OF PRACTICE

Type of Practice	Questionnaires Returned	Positive Replies	No. of Cases	Average Per Reply	Per Cent of Total
Internist	173	27	48	1.7	3.3
Pediatrician	62	45	236	5.2	16.5
General	707	389	1112	2.8	77.5
Surgeon	166	11	26	2.3	1.8
Other	411	6	12	2.0	0.8
Total	1519	478	1434	3.0	99.9

eral practitioners reporting the next highest average. Also for these younger patients, the percentage of all the cases reported by pediatricians rises, and the percentage reported by internists drops considerably, as compared to the situation for rheumatic fever cases regardless of age. Again, however, the general practitioner group reports by far the greatest percentage of the total number of cases, 77.4 per cent.

In addition to the five counties not reporting any cases of rheumatic fever, three other counties, Clearwater, Lake, and Sherburne, reported no cases in children under fifteen years of age. Only one physician returned a questionnaire from one of these counties, and two replies were received from each of the other two counties.

The same comments regarding the distribution of cases by counties that were made earlier in relation to all reported cases hold true for the cases in children under fifteen years. It is true that pediatricians are relatively few and located in more metropolitan areas, but their data is likewise included in the Table VI showing rates per 1,000 population by districts.

Again it is difficult to explain why some physicians report treating cases while other physicians do not. Seventeen (27.5 per cent) of all the pediatricians returning questionnaires reported treating no cases of active rheumatic fever in children currently or within twelve months. Their colleagues who did report cases averaged 5.2 such cases in their practices. It would seem that if the disease occurs to that extent in the practice of forty-five (72.5 per cent) of all pediatricians, the remaining pediatricians should be seeing some cases. Further study of the negative replies may help to explain this.

The third question of the survey asked the doctor to report the number of individuals in his practice to whom he was currently giving some form of prophylaxis to prevent the development of

rheumatic fever. The question was intended to give another indirect numerical measure of the size of the rheumatic fever problem in general, to supplement the data regarding active cases of the disease.

TABLE VIII. REPORTED NUMBER OF INDIVIDUALS RECEIVING PROPHYLAXIS AGAINST RHEUMATIC FEVER, BY TYPE OF PRACTICE

Type of Practice	Questionnaires Returned	No. of Positive Replies	Number of Individuals	Average	Per Cent of Total
Internist	173	95	433	4.5	13.0
Pediatrician	62	50	624	12.4	18.8
General	707	473	2183	4.6	65.6
Surgeon	166	14	55	3.9	1.6
Other	411	12	28	2.3	0.8
Total	1519	644	3323	5.1	99.8

Of the 1,519 physicians returning questionnaires, 644 (42.3 per cent) reported that they were giving prophylaxis to their patients. This is a slightly higher proportion of doctors than reported actual cases of the disease, indicating that physicians recognize the importance of prevention of the disease even when they are not seeing cases in their practice. The 644 physicians reported a total of 3,323 individuals who were being given some form of prophylaxis. This is an average of 5.1 persons for each reporting doctor. Compared to the total number of active cases of rheumatic fever reported, 2,297, an average of 1.4 individuals were receiving prophylaxis for every case reported.

When the data is arranged by type of practice of the reporting physician as in Table VIII, it becomes apparent that pediatricians as a group prescribe prophylaxis for almost three times the average number of individuals that other physicians do. Very little difference appears among internists, general practitioners, and surgeons.

Again, general practitioners reported the largest portion of all the individuals receiving prophylaxis, but internists and pediatricians reported an appreciable number, greater in terms of percentage than their share of all active cases of rheumatic fever reported in the survey. Doctors from eighty-five of the state's eighty-seven counties reported giving prophylaxis of some kind to individuals in their practices. One negative report was received from one county, Kanabec, where four physicians were queried, and one negative questionnaire was returned from the second county, Dodge, where seven physicians were queried.

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Variations in the degree to which prophylaxis was reported from various counties is shown in Table IX, where counties are grouped into districts.

The significance of the data reported on the

TABLE IX. REPORTED NUMBER OF INDIVIDUALS RECEIVING PROPHYLAXIS, RATE PER 1,000 POPULATION, BY DISTRICTS

District	Headquarters	1954 Estimated Population	Number of Individuals	Rate Per 1,000 Population
I	Bemidji	227,164	135	0.59
II	Mankato	269,976	340	1.25
III	Rochester	329,853	417	1.26
IV	Duluth	285,438	185	0.64
V	Worthington	227,423	267	1.17
VI	Minneapolis	1,308,909	1501	1.14
VII	Fergus Falls	220,812	243	1.09
VIII	Little Falls	269,297	235	0.87
Total		3,138,872	3323	1.05

questionnaires is difficult to determine. It must be remembered that the questions called for a quick numerical answer that in many cases, no doubt, was solely an estimate. However, the average number of cases or individuals receiving prophylaxis reported in any doctor's practice was uniformly small, so that his estimate would seldom be very far off. More often, the doctor would know exactly how many such patients to report. Undoubtedly there may be some duplication of reporting, inasmuch as one patient may have visited more than one physician, but it is felt that this is not a major source of error. It should be remembered that only half of all the physicians who were sent questionnaires returned them. Because the participation by physicians, despite this response, was still fairly representative of all areas, types of practice, and type of response whether positive or negative, it may be argued that the reported numbers of cases and individuals receiving prophylaxis could be safely doubled on the basis of results reported.

Be that as it may, another serious question affecting the significance of the survey results lies in the nature of the disease which the doctor reported as a case of active rheumatic fever, or against which he was prescribing prophylaxis. Comments on a number of replies indicated that some physicians feel that the diagnoses of rheumatic fever made by their colleagues do not represent true instances of the disease, and that the term rheumatic fever is applied much too loosely to fairly large numbers of illnesses for want of a

TABLE X. REPORTED CASES, PER 1,000 POPULATION, OF POLIOMYELITIS, RHEUMATIC FEVER, AND TUBERCULOSIS, MINNESOTA, SELECTED YEARS

Disease	Maximum Year, 1950-54		Minimum Year, 1950-54	
	Cases	Rate Per 1,000	Cases	Rate Per 1,000
Poliomyelitis: All ages	3926	1.28	502	.17
Under 15 years	2546	2.92	315	.38
Tuberculosis: All ages	2688	.90	1629	.52
Under 15 years	115	.14	82	.09
		Cases	Rate	
Rheumatic Fever: All ages	2290	.73 (1955 Survey)		
Under 15 years	1428	1.53 (1955 Survey)		

more exact diagnosis. It is hoped that additional study of a few representative counties, with more regard to the clinical disease entity reported by physicians, will help to clarify this situation. The present survey, by definition, aimed solely at assessing the rheumatic fever problem as defined by individual practicing physicians.

The reported incidence rates for active rheumatic fever may be compared with similar rates for other diseases, commonly recognized as problems. Table X shows these figures, from data of the Minnesota Department of Health. When the recurrent, long term nature of rheumatic fever, with its serious disabling complications, are recalled, these rates would indicate the real problem that the disease still poses.

Summary

Of 3,063 questionnaires on the current problem of rheumatic fever sent to physicians in Minnesota, 1,556 were returned. Five hundred and ninety-seven reported a total of 2,297 cases of active rheumatic fever, from eighty-two of the state's eighty-seven counties. Of the cases, 1,434 were under fifteen years of age. Six hundred and forty-four physicians reported that they were giving some form of prophylaxis to prevent the development of rheumatic fever to a total of 3,323 individuals.

These data, from 50.8 per cent of all physicians queried, indicate an incidence rate of rheumatic fever, of .73 cases per 1,000 population, all ages, or 1.5 to 1.7 per 1,000 population for children under age fifteen years. The data indicate also that at least 1.05 persons per 1,000 population are currently receiving some form of prophylactic therapy to prevent rheumatic fever.

Home Accident Prevention

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HOME accidents are causing a death every eighteen minutes and an injury every seven seconds in the United States. In Minnesota last year, one out of every fifty-two deaths was caused by a home accident. Fatal accidents are only part of the picture. According to the National Safety Council, for every fatal home accident there are four permanent disabilities and from

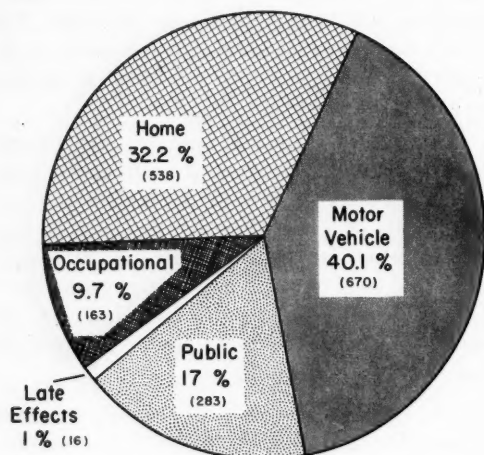


Fig. 1. Accidental deaths by major classification (1670 deaths) by occurrence in Minnesota, 1954. Minnesota Department of Health.

100 to 150 non-fatal accidents. This means that in addition to the 538 men, women and children who lost their lives as the result of home accidents in Minnesota in 1954, more than 2,000 were permanently disabled and about 70,000 suffered minor or more serious injuries.

Now, just what is an accident? One dictionary defines an accident as an unexpected or unforeseen event, generally unfortunate. Many of the events that are tabulated as accidents would hardly qualify under this definition, except for the last phrase, "generally unfortunate." The National Safety

Council states that an accident includes any suddenly occurring unintentional event which causes injury or property damage. A home accident is one that takes place within the home or on the home premises.

There was a total of 1,670 accidental deaths in Minnesota in 1954. Of these, 670 (40 per cent) were motor vehicle deaths; 538 (32 per cent) were home fatalities. Thus, home fatalities are almost as serious a problem as motor vehicle deaths, actually less than 8 per cent difference; yet traffic accidents steal the limelight because they are spectacular and home accidents receive comparatively little public attention (Fig. 1).

Falls account for the greatest number of fatal home accidents, 317 (60 per cent). Next, in order of frequency, were burns, responsible for 75 deaths; poisoning, 37; mechanical suffocation, 32; firearms, 13; drowning, 9; and machinery accidents, 8 deaths (Fig. 2).

Age is a significant factor in home accidents, with the extremes of life most frequently affected. Home accidents killed 308 people 65 years of age and older, and 77 persons from 45 to 64 years (Table I). They also took the lives of 82 children under five years of age, and 33 from 5 to 14 years. There were only 38 deaths between 15 and 44 years of age. Thus, more than half (57 per cent) of home fatalities involved those 65 years and older, and 71 per cent were 45 years of age and older. Twenty-one per cent were under the age of 15 years.

TABLE I. HOME ACCIDENT DEATHS BY SPECIFIC AGE GROUPS, MINNESOTA, 1954

Ages	All Ages	0-4 Years	5-14 Years	15-24 Years	25-44 Years	45-64 Years	65 and Over
Totals	538	82	33	6	32	77	308
Per cent	100.0	15.2	6.1	1.1	6.0	14.3	57.3

As to sex, under the age of nineteen, there are twice as many fatal accidents in boys as in girls. In old people this is reversed. In those sixty-five

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years of age and older there are twice as many fatalities in women as in men.

The leading cause of death in childhood is not heart disease, cancer, or communicable dis-

dental deaths in children under the age of fifteen in 1954, eighty-two (33.6 per cent) were motor vehicle fatalities and forty-two (17.2 per cent) were drownings. Thus, motor vehicle fatalities

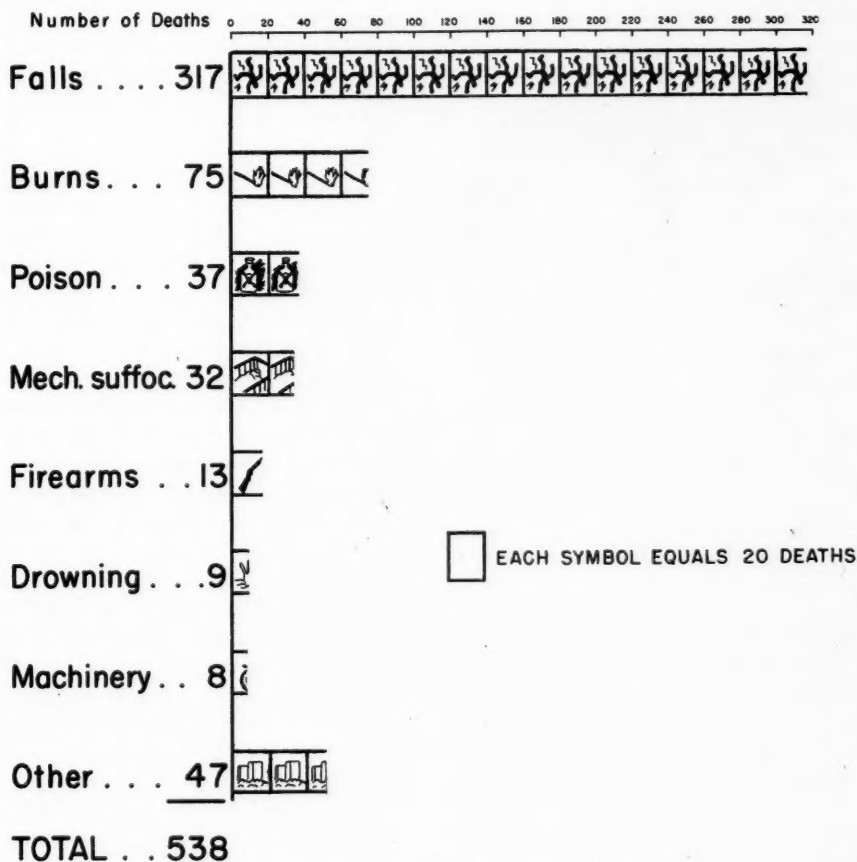


Fig. 2. Major causes of fatal home accidents by occurrence in Minnesota, 1954. Minnesota Department of Health.

ease. And certainly not poliomyelitis. Accidents are the leading cause in childhood, responsible for more than one-third of all deaths and equalling the total of the next four or five leading causes combined (Fig. 3). In 1954, accidents caused as many deaths as the total caused by cancer, pneumonia and influenza, diseases of the central nervous system, poliomyelitis, nephritis, rheumatic fever, measles, and tuberculosis.

While one-half of fatal child accidents are home fatalities the specific causes of child fatalities differ somewhat from the home accident summary, because motor vehicle and other public accidents are included (Table II). Of the 244 acci-

are the leading cause of accidental deaths in childhood, responsible for one-third of such deaths. These include not only non-collision and collision of motor vehicles in which children are riding or driving but also motor vehicle-bicycle accidents as well as motor vehicle-pedestrian accidents. Motor vehicle-pedestrian accidents account for one-half of motor vehicle deaths in children. Of these three-fourths are under ten years of age, an age during which close parental supervision should prevent most of these fatalities. These involve children playing in the streets, darting behind cars into the street, chasing balls or toys into the path of automobiles, or crossing the street or road

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other than at intersections. These accidents also include fatalities in the driveway, garage, front of the home or in the back yard, frequently, because parents failed to "stop, look, and listen" before driving their car.

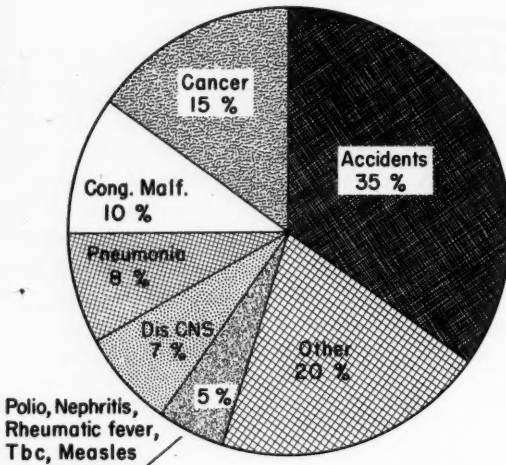


Fig. 3. Leading causes of death among children one to fifteen years by occurrence in Minnesota, 1954. Minnesota Department of Health.

Drownings are the second leading cause of accidental deaths in children, responsible for one-sixth of the deaths (17.2 per cent). These include public as well as home drownings. Drownings occur because babies are left in the bathtub while the mother answers the phone or doorbell; because young children are left near unfenced garden pools, near water troughs, open wells or cisterns on the farm; because children do not know how to swim, or swim alone or dive in unexplored water. Drownings occur because we disregard safe rules of boating, swimming and skating and because we do not know life saving measures.

In home accidents, falls are the leading cause of death (Table III). Falls took the lives of 302 persons forty-five years of age and older, almost 90 per cent of these being sixty-five years and over. Only fifteen fatal falls were recorded for persons under forty-five years of age, and eleven of these occurred in children under the age of fifteen. It is evident that falls are a particularly serious problem for those in the sixth decade of life and beyond where the physical infirmities of older age play an important role. While falls are fre-

TABLE II. PRINCIPAL CAUSES OF ACCIDENTAL DEATHS IN CHILDHOOD 0-14 YEARS, BY NUMBER AND PER CENT, MINNESOTA, 1954

Type of Accident	Number	Per Cent
Total	244	100.0
Motor Vehicle	82	33.6%
Drowning	42	17.2
Mechanical suffocation	30	12.3
Burns and conflagration	22	9.0
Obstruction or suffocation by food or external means	17	7.0
Falls	12	4.9
Machinery	10	4.1
Firearms	9	3.7
Poisoning	8	3.3
Other	12	4.9

quent in children they cause few deaths in this age group.

Fatal falls result from accidents in all rooms of the home, on the stairs, as well as in the yard. They occur from tripping over a carpet, from stair carpeting and scatter rugs that are not tacked down or do not have non-skid rubber backing; from poor arrangement of furniture with foot stools, magazine racks, smoking stands and other small pieces of furniture placed where they can be tripped over. Falls occur from inadequate lighting, from lack of bedside lights and readily accessible light switches, and from lack of hand grips and bath mats for shower stalls and tubs. Fatal falls occur from use of makeshift ladders of boxes or chairs, from using stairs as storage areas, from leaving roller skates and other toys on the steps or floor. Falls also occur from leaving garden tools and other equipment lying about the yard and from slippery steps and walks. Prevention requires good housekeeping, periodic checkups and proper supervision of the infirm and aged.

Burns caused seventy-five deaths in 1954. Thirteen deaths occurred among children under the age of five, and twenty-two were sixty-five years or older. Thus, almost half occurred at the extremes of life. Fatal burns resulted from permitting babies and toddlers in the kitchen while meals were being prepared, or near containers of boiling water or hot grease, or having pot and pan handles on the stove where youngsters could reach them. Fatal burns resulted from failure to keep matches in metal containers out of reach of children, from faulty gas stoves or furnaces, chimneys and flue passages, and from untended trash burning or bonfires. Burns were also caused by careless smoking, especially in bed, and from the foolhardy practice

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TABLE III. HOME ACCIDENT DEATHS BY CAUSE AND SPECIFIC AGE GROUPS MINNESOTA, 1954

Type of Accident	All Ages	0-4 Years	5-14 Years	15-24 Years	25-44 Years	45-64 Years	65 and Over
Home Total	538	82	33	6	32	77	308
Falls	317	4	7	—	4	30	272
Fire, explosion, burns	75	13	7	3	15	15	22
Poisonings (gas excepted)	37	7	1	1	7	17	4
Mech. suffocation	(16)	(7)	(1)	—	(4)	(4)	—
Firearms	32	30	—	1	—	1	—
Machinery	13	—	6	1	2	2	2
Other	10	3	7	—	—	—	—
	54	25	5	—	4	12	8

of pouring gasoline or kerosene on fires to kindle or hasten them.

Accidentally swallowed poison resulted in seven deaths in children under age five, almost half of the sixteen poisonings of this type. Poisonings resulted from leaving medicines, poisons, and cleaning compounds as lye, ammonia or silver polish where children could reach them; from failure to read labels on medicine; from failure to clearly mark poisons and to keep them locked up; from taking medicine in the dark, and from failure to promptly take the proper antidote and to call a physician.

Poisoning from gas and vapors occurred mostly in adults and resulted in twenty-one deaths. They are most frequently the result of running the motor of a car in a closed garage, and occasionally from use of unvented gas heaters, or from gas escaping as a result of the flame being extinguished by boiling water on a gas stove.

There were more deaths from firearms in and around the home than from hunting accidents. Ten occurred as the result of hunting accidents; thirteen were home fatalities. Of the latter, six were between five and fifteen years of age. Accidents involving firearms are due to failure to unload guns, cleaning guns improperly, dropping or knocking them off a support, leaving guns where children can find them, and neglecting to keep guns and ammunition in separate places and locked up. These accidents happen because children and youth are not taught the dangers of firearms, and are not properly trained in the safe handling and use of firearms.

A few words should be said about mechanical suffocation in bed or cradle, listed as the cause of death in thirty children under the age of one in 1954. Many so-called cases of suffocation by bed clothes are actually the result of an acute respiratory infection, frequently virus in origin.

While some of these deaths may be due to suffocation, many are due to unrecognized fulminating disease. Under such circumstances it is important that an adequate autopsy be carried out. Only by this means will it be possible to avoid that unfortunate "guilt complex" that parents may develop in the belief that carelessness was responsible for the death of their baby.

Home accidents are of particular concern to public health workers because: (1) they affect large numbers of people; (2) they affect every locality and every age group; (3) they are the leading cause of death in childhood; and (4) they are in seventh place among the ten leading causes of death in Minnesota. Home accidents have become one of our serious public health problems.

How individuals can best be made aware of the implications of safe homes, safe equipment and safe habits is still an unanswered question. The greatest obstacle to home accident prevention, according to the National Safety Council, is the fact that each householder must be his or her own "safety engineer." Unfortunately most householders are unaware that there are any serious hazards in the home or yard. It is important to note that accident prevention is not only a physical problem but is also a psychological problem. It must also be emphasized that accidents do not just happen; they are not acts of God. Accidents are caused. They are caused either by defects in the environment or by defects in human behavior, or more often by both. Therefore, there are practical methods for reducing the number and severity of home accidents.

Health workers must first be acquainted with the size and extent of the problem. They must know the number and type of fatalities and their relative importance in comparison with other causes of death. They must know the causes of home accidents, by type of accident and specific age group, and the specific preventive measures. They must, of course, know how to apply public health methods and techniques.

Public health workers should participate in the tabulation and analysis of records to determine the local problem by: (1) study of home accident death certificates, (2) follow-up of fatal home accidents through the family, the physician or the coroner, (3) study of non-fatal accidents in the community. They should help develop and promote the reporting of all accidents in the schools. They should promote the study of home accident

cases in local hospitals through the local medical society and hospital staffs. They should participate in safety inspections. They should stimulate interest in the development and extension of local safety councils or other civic groups interested in home safety.

Finally, certain health workers and their possible contributions to the home safety program should be specifically mentioned.

The Physician.—The general practitioner has a vital role in attempting to reduce the toll from childhood accidents. He sees about 90 per cent of all children, while pediatricians see about 10 per cent. By pointing out to parents the physiology and development of the child and the anticipated changes, the physician can teach parents the necessity for child protection in early life from danger he cannot appreciate. Children under the age of one are entirely dependent upon some adult for their comfort, their care, their feeding, and their safety. He can point out the need for education and planned experiences in later childhood, within the limits of his developmental abilities, specific interests and local opportunities. And, when reason is not possible he can impress upon parents the necessity for discipline. With the aged, good medical care and adequate supervision are necessary and adjustments must be made for their years and needs.

The *public health nurse* is a key person in home safety because of her easy access to and acceptance in the home. She has the opportunity to observe the habits of the mother, the use of faulty equipment and poor housekeeping. She should observe potential accident hazards and should suggest corrections. She should incorporate home safety in

her home visits by emphasizing safety in her teaching especially in maternal, infant, child, nutrition, care of the aged and in the administration of medications and treatments. Home safety should be included in her school activities as well as through teacher-parent-child and nurse conferences. She should interpret accident causes and prevention to community groups and should encourage community participation in home accident prevention activities. Perhaps it might be more effective to stress injury prevention activities.

Public Health engineers and sanitarians should include the investigation of potential hazards and safety education in their daily activities. Sanitation personnel can bring to the attention of the householder existing environmental hazards in the home or yard, unsafe activities, and the best means of controlling or eliminating such dangers.

Health educators can assist in the development and extension of home safety programs and can develop effective audio-visual aids as literature, films, slides, exhibits, as well as radio and television scripts and news releases to be used in such programs.

These techniques are the ones which health workers apply to other phases of preventive medicine: education, inspection, and the recognition and correction of physical, mental, emotional and environmental defects. These techniques should stimulate the family to develop safe habits and practices; they should promote community interest and participation in effective home safety activities; they should ultimately lead to a lowered incidence of home accidents.

BILIARY STRICTURE

(Continued from Page 195)

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Case Presentations

Hematoma of the Rectus Abdominis Muscle

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NO DOUBT more cases of hematoma of the rectus abdominis muscle occur than are recognized, but the entity is rare enough to cause interest when encountered. I have seen only two such patients in nineteen years of general practice.

Diagnosis

A hematoma of the rectus abdominis muscle may be mistaken for a number of intra-abdominal conditions. In only a small percentage of the cases is the diagnosis made preoperatively. This is due to the rarity of the condition, as the diagnosis should not be mistaken if kept in mind. The diagnosis is not as simple, however, as seems obvious to the uninitiated. In addition to right lower quadrant pain, nausea and moderate leukocytosis complicate the picture.

Anatomy and Mechanics Involved

The rectus abdominis muscle undergoes great stress in carrying out the ordinary functions, as well as the unusual ones, to which it falls heir. It must take part in such activities as coughing and sneezing, defecation and regulating intra-abdominal pressure.

The blood supply of the muscle is from the superior and inferior epigastrics. They flow cephalad and caudad, respectively, in a groove on the dorsal surface of the rectus muscle for a short distance before entering the substance of the muscle. This dorsal location of the vessels of blood supply obviously was intended to prevent rupture of the vessels and the consequent hematoma formation. Incidentally, absence of the posterior rectus sheath, caudad from the linea semicircularis of Douglas, is no doubt instrumental in bringing about symptoms simulating intra-abdominal pathology when thrombosis occurs, as it nearly always does, near the distal end of the muscle.

Another salient feature of the anatomy of the distal end of the rectus muscle is that a hematoma here not only can dissect laterally but may spread

to the opposite side. In addition to peculiarities of the anatomy, there are such precipitating causes as coughing, child bearing, athletics, direct trauma, debilitating diseases and blood dyscrasias.

Report of a Case

A twelve-year-old white boy was brought to my office by his parents on July 23, 1954. The parents gave a history that "the boy ruptured himself a couple of days ago." Examination revealed no cough reflex in the inguinal canal, but he did display a rigid, tender mass just proximal to the symphysis pubis on the right side. He was nauseated and his white blood cell count was 9,000 per cubic mm. He was sent home with instructions to keep an ice bag over the mass continuously and to carry out strict bed rest. Menadione, gr. 5 three times daily was prescribed.

The parents reported back to my office every few days, assuring me that the patient was improving. However, they brought him to my office on July 28, 1954, at which time there was a large fluctuating mass at the site of the previous small rigid one. The skin over the area was deeply discolored. He was taken to the hospital for operative intervention.

The distal portion of the right rectus muscle was exposed by a paramedian incision down to and including the anterior rectus sheath. Most of the clot was easily evacuated, but some of it was intimately associated with the fibers of the muscle. Considerable active bleeding was encountered. The sources of this were sought out and the vessels ligated. A fairly dry field was obtained, and the incision was closed in layers without drainage. A pressure dressing was applied and an ice bag was kept over this for the first two postoperative days.

Microscopic section of the clots removed showed fibrocollagenous tissue with areas of fibroblastic proliferation and round cell infiltration. A few well formed capillaries were scattered through the tissue.

The patient's convalescence left much to be desired since the mass had returned to its preoperative size by the third day. Removing two sutures to provide drainage, and continuous boric acid solution packs turned the tide, however. He was discharged on August 9, 1954, with instructions to continue with the boric acid solution packs at home. It required about a month before his recovery was complete.

My second patient was that of a twenty-six-year-old veteran. He went to a veteran's hospital after my diagnosis, and I was unable to follow the course of his illness.

(Continued on Page 222)

Pheochromocytoma in a Seven-year-old Girl

Report of Successful Removal

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A PHEOCHROMOCYTOMA is a functioning tumor of chromaffin tissue which usually arises in the adrenal medulla. Since chromaffin cells secrete epinephrine and nor-epinephrine, the tumors characteristically produce hypertension which may be paroxysmal or sustained.

Although the tumors are rare in children, they should be considered in the differential diagnosis of any hypertensive child because they represent a curable form of hypertension. Delay in diagnosis steadily increases the jeopardy of the patient.

This case is presented to illustrate the clinical course and surgical cure of one of the few patients reported during the first decade of life.

Case Report

History.—A seven-year-old girl was admitted to the hospital on April 14, 1953, with the chief complaints of severe headaches, irritability and episodes of nausea. The headaches began about a year prior to admission and occurred at irregular intervals. They were increasing in frequency and severity the past two months and were precipitated by any physical or emotional strain such as attending a birthday party or being teased by her brother. Her irritability had become so marked that despite sedation and analgesics, she had become unmanageable at home during the past week. She was anorexic, losing weight and had increasing bouts of nausea and vomiting. Drenching sweats were noted, despite her normal temperature.

Physical Examination.—The patient was thin and wore an anxious and distressed expression (Fig. 1a). She was 47 inches tall and weighed 37 pounds. Her temperature was 98.8° (rectal), pulse 130, respirations 24, and blood pressure upon admission was 194/150. The eye grounds showed a slight hyperemia of the right disc. No vascular spasm or papilledema was evident. There was a mild hypertrichosis of the face, trunk and extremities. Heart tones were loud with snapping systolic and diastolic sounds, but no murmurs were heard. Abdominal examination revealed no abnormality.

Laboratory Data.—The hemoglobin level was 14.6 gms., red blood count 4.77 million, leukocytes 10,650 with 67 per cent neutrophils, 31 per cent lymphocytes and 2 per cent monocytes. Urinalysis revealed 1+

albumin and 2-6 hyaline casts per low power field. Determinations of blood urea nitrogen, basal metabolic rate and serum electrolytes were normal.

X-rays of the chest, skull and intravenous pyelograms revealed no abnormality.

An electrocardiogram showed a sinus arrhythmia and a tendency to right axis deviation.

Special Study.—Since the diagnosis of pheochromocytoma was suspected, a test using the adrenolytic agent, benzodioxane, was done (Fig. 2). With the patient resting quietly blood pressure levels around 220/180 were first recorded. Following intravenous injection of 10 mg. of benzodioxane the pressure fell within a minute to 120/60 where it remained over five minutes.

Operation.—A polythene cannula was placed in the saphenous vein and 5 per cent glucose in water containing 4 cc. of Levarterenol (Levophed) per liter was connected. A syringe of the depressor drug, phentolamine (regitine) was in readiness. A transverse upper abdominal incision was made. Gentle palpation revealed a tumor nearly 2 inches in diameter in the right adrenal area. The remainder of the possible chromaffin tissue sites in the abdomen was examined including visualization of the left adrenal which appeared normal. The right adrenal tumor was then removed through a transperitoneal approach. Despite the fact that the patient was receiving intravenous solution containing Levophed, she had a profound drop in blood pressure when the tumor was removed; and it was an hour later before she had stabilized well enough to be moved from the operating table.

Pathologic Report.—The tumor measured 4 by 4 by 3 cm. and weighed 16 gm. (Fig. 3). The cut surface had a pale tan color. Histologic sections showed pheochromocytoma.

Postoperative Course.—The patient did well until the second postoperative night when she experienced a generalized convulsion. She received intravenous sodium amytal at intervals during the night and was not oriented for nearly twenty-four hours. The remainder of her convalescence, however, was most gratifying. Her blood pressure remained stable and she required no Levophed after the third post-operative day. The reduction in her pressure following surgery is shown in Figure 4. Her headaches, hyperhidrosis and nausea ceased. The albuminuria cleared within a week. Her

disposition and countenance reflected these improvements, and she was discharged on the twelfth post-operative day. Her improvement in the intervening two years may be noted in the recent photograph shown in Figure 1b. At her most recent office visit, a blood pressure of 100/62 was obtained.



Fig. 1. Appearance of seven-year-old patient. (a) Preoperative. (b) Two years after operation.

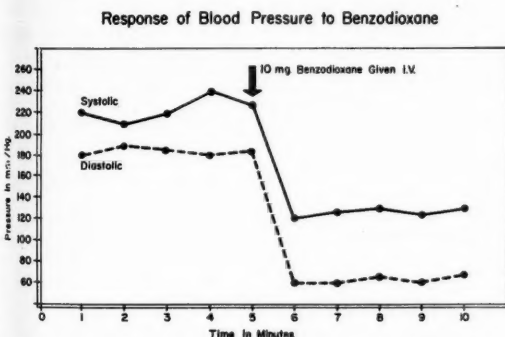


Fig. 2. Response of blood pressure to benzodioxane injection.

Comment

The first adequate clinical description of hypertensive crisis in association with an adrenal tumor was given by L'abbe in 1922.¹ Charles Mayo reported the first successful operative removal of such a tumor with relief of symptoms in 1927.²

About three hundred patients have now been described in the literature who have been diag-



Fig. 3. Pheochromocytoma, gross appearance.

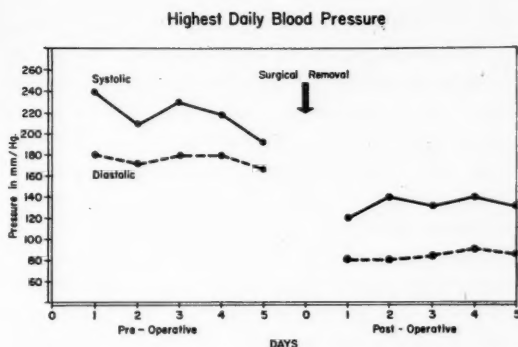


Fig. 4. Comparison of blood pressure, preoperative and postoperative levels.

nosed in life or at autopsy. We were able to find reports on thirty-two children under the age of fourteen years.^{3,4,5} The symptomatology parallels the adult cases in essential respects with anxiety and nervousness, hyperhidrosis and headaches the most common features in their histories. Of the thirty-two children reported, ten were diagnosed at autopsy, eight died at operation and fourteen survived surgical removal of the tumor.

The pharmacologic tests which are so valuable in diagnosis of pheochromocytoma have been developed during the past decade.^{6,7,8} Two types of drugs may be used. Those which elevate the blood pressure are given to reproduce the patients' at-

tacks, and those which act as adrenolytic agents are given to obtain an abrupt lowering of the hypertension when due to a tumor. It is the opinion of Kvale, Priestly, and Roth,⁹ who have reported the largest series of these tumors, that histamine is the most reliable drug for diagnosing pheochromocytoma that causes paroxysmal hypertension, and phentolamine (regitine) and benzdioxane (benodaine) are the most valuable diagnostic agents in pheochromocytoma with sustained hypertension.⁹

Once the diagnosis is made, the treatment is surgical removal. Although the tumor may arise in any area where chromaffin tissue is present, nearly 90 per cent of the hypertensive cases occur in the adrenal medulla. About one-fifth of such cases are bilateral or multiple.¹⁰ Because of the high incidence of bilateral tumors, elaborate diagnostic attempts to localize an adrenal tumor have little to commend them. A transverse upper abdominal incision allows the best access to the potential tumor sites. The tumor should be manipulated or compressed as little as possible; the adrenolytic agent, regitine, should be used to combat blood pressure elevation; hypotension following removal of the tumor must be corrected with the use of the pressor drug, Levophed. Postoperatively the systolic pressure should be maintained over 100 mm. by regulating the rate of flow of a constant intravenous solution of 5 per cent glucose in water containing this drug. The patient may require Levophed in such a manner for several days. It is interesting to note that the severity of the clinical symptoms may have no correlation with the size of the tumor.

Summary

This report presents the clinical course and management of a seven-year-old girl with an adrenal pheochromocytoma. Following operative removal of the tumor, her symptoms and hypertension have been relieved.

We wish to thank Dr. Robert Wilder and his associates for their valuable aid and co-operation in the management of this patient.

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HEMATOMA OF THE RECTUS ABDOMINIS MUSCLE

(Continued from Page 219)

Treatment

This condition has been successfully treated both by conservative measures such as ice bags, bed rest and sedatives and by operative means. My patient received both. If operation is resorted to, the shorter the delay the better the results.

Summary

Attention is called to the rarity of hematoma of the abdominis rectus muscle. The anatomy, mechanics and functions of the parts involved are reviewed. A case is presented along with its treatment.

Continuation Studies

GROWTH HORMONE

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THE phenomenon of growth is dependent upon a multitude of interlacing factors, among which hormonal regulation plays an important role. Two phases of growth under hormonal control appear in the human subject. The first phase, prepubertal growth, is largely under the regulation of the pituitary growth hormone and has its most rapid spurt during the first few months of life with a gradual decrease in rate until puberty. Growth hormone has no effect on epiphyseal fusion.

The second phase of growth begins at the onset of puberty and is attributed to the steroid hormones derived from the gonads and adrenal cortex. In response to production of pituitary gonadotropic hormones, the male and female gonads, as well as the adrenal cortex, produce steroids that stimulate growth of bone and soft tissues. This stimulation results in skeletal maturation and eventual closure of the epiphyses.

The serum inorganic phosphorus is elevated in the prepubertal age and appears to be an index of growth hormone production or activity. A fall in inorganic phosphorus occurs during puberty. This decrease is probably the result of inhibition of pituitary growth hormone production by the steroid hormones.

Deviations from the normal growth pattern occur when there is a decrease in or excessive production of pituitary growth hormone. Lack of sufficient growth hormone results in the syndrome of pituitary dwarfism. The decreased production may result from pituitary hypoplasia or pituitary destruction. In the majority of cases there is usually an associated hypogonadism as the result of the lack of pituitary gonadotropin production.

Excessive production of pituitary growth hormone as the result of tumor or hyperplasia of the eosinophilic cells of the anterior pituitary results in the syndromes of gigantism or acromegaly. In gigantism excessive production of growth hormone occurs prior to the closure of the epiphyses and coincides with the normal prepubertal growth period. There is a proportional type of growth; abdominal viscera are large but not out of proportion to the rest of the skeleton. In acromegaly the overproduction of growth hormone occurs after epiphyseal closure. There is increased thickness of the entire skeleton and increase in total mass of soft tissues as well, without an increase in linear growth. The paranasal sinuses become enlarged and all cartilages calcify.

The serum inorganic phosphorus is elevated in almost all active acromegalic patients. The serum phosphorus can be depressed when either androgen or estrogen is administered and remains at lower or normal levels so long as steroid hormone is administered. This depression of serum phosphorus is usually associated with evidence of clinical improvement of the acromegalic state.¹ It appears that serum phosphorus is an index of pituitary growth hormone production; and androgenic and estrogenic hormones inhibit the production of pituitary growth hormone by the anterior pituitary and/or inhibit the peripheral effects of pituitary growth hormone.

The growth promoting properties of anterior pituitary extracts have been demonstrated for thirty-five years. More recently chemical procedures have been developed for obtaining crystallized growth hormone of varying degrees of purity which have been employed in biological investigations. Though a mass of literature has accumulated on the effects of growth hormone in animals, the data regarding human subjects is meager and contradictory. Extensive studies in animals have revealed not only the growth pro-

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TABLE I. METABOLIC EFFECTS OF GROWTH HORMONE IN ANIMALS

1. Promotion of growth of skeleton and soft tissues.
*2. Increased nitrogen retention.
*3. Increased calcium retention.
*4. Increased phosphorus retention.
5. Elevation of serum inorganic phosphorus.
6. Elevation of serum alkaline phosphatase.
*7. Glycosuria.
*8. Impaired glucose tolerance.
*9. Increased insulin resistance.
10. Decrease in blood amino acids.
11. Increase in fasting ketone bodies.
12. Fat mobilization and decrease in body fat.
13. Increase of various enzymatic reactions.
14. Increase of glomerular filtration rate and renal plasma flow.
15. Galactopoietic effect.
16. Maintenance of muscle glycogen in hypophysectomized rats.
*17. Increase in rate of tumor growth of breast and prostate cancer (in man only).

*Effects demonstrated in man.

moting properties of this hormone, but its influence on a wide variety of metabolic processes² (Table I). Among these are an elevation of serum inorganic phosphorus and alkaline phosphatase, and increased retention of calcium, phosphorus and nitrogen. Convincing evidence is available that growth hormone increases the anabolism and decreases the catabolism of protein. The fundamental mechanism by which the hormone promotes the formation of body protein and spares protein stores during fasting is unknown.

An anti-insulin effect on carbohydrate metabolism has been demonstrated. This resulted in reversible or permanent glycosuria, reversible or permanently impaired glucose tolerance, and increased insulin resistance. The mechanism of this action is unknown. There appears to be an antagonism between insulin and growth hormone, possibly exerted on the enzyme hexokinase in the process of glucose phosphorylation. Whether growth hormone and diabetogenic hormone are the same or separate factors has not been clearly defined.

If the primary action of growth hormone is to decrease protein catabolism, more fat would be mobilized and utilized as an energy source. The hormone is capable of mobilizing body fat, produces ketonemia in fasting rats and decreases the total body fat. It appears unnecessary to postulate the existence of a specific ketogenic hormone in view of these effects on fat metabolism.³

Other metabolic effects consist of a decrease in blood amino acids, maintenance of muscle glycogen in hypophysectomized rats, increase in glomerular filtration rate and renal plasma flow, and enhancement of various enzymatic reactions. Little evidence has been gained, however, indicating the mechanisms by which these effects are produced.

The role of growth hormone in mammary development has been described.⁴ In hypophysectomized, oophorectomized virgin rats, mammary development simulating early pregnancy was induced by injecting estrone, progesterone and lactogenic hormone. When growth hormone was injected, as well as these other hormones, complete lobulo-alveolar development similar to late pregnancy was induced. Lactation would occur if ACTH or cortisone were also administered. In cows the administration of growth hormone caused significant increases in milk yield (galactopoietic effect).⁵ The effect of growth hormone in mammary gland physiology appears well established.

The evidence for the action of administered growth hormone or somatotropin in man is scant. The available data are contradictory as to whether growth hormone can achieve protein anabolic effects or influence carbohydrate metabolism, as well as to reproduce metabolic processes described in animals. The conflicting data is primarily the result of the lack of an adequately prepared pure preparation of growth hormone in sufficient amounts for clinical investigation. The discrepancies in data appear to be due to contamination of the hormone with thyrotropin or ACTH, loss of activity in handling the preparation, or other problems related to its chemical preparation. The responsiveness to the hormone might also be conditioned by the metabolic status of the subject treated. More recently the development of an anti-growth hormone factor has been postulated as an explanation for the lack of consistent investigations.⁶

Extensive metabolic studies have been carried out in the human.⁷⁻⁹ From these investigations it is possible to draw some conclusions as to the action of somatotropin in human subjects. Crystalline somatotropin is capable of bringing about many of the major metabolic effects characteristic of this hormone in animals. There is enhancement of the storage of nitrogen, calcium and phosphorus requisite for the growth of skeleton and soft tissues. Impairment in carbohydrate metabolism has been manifested by the development of a diabetic type of glucose tolerance curve, increased insulin resistance and glycosuria. All of these alterations were reversible. No consistent changes have been observed in the serum inorganic phosphorus or alkaline phosphatase. Though an increase in height and weight of human subjects of short stature has occurred

TABLE II. EFFECT OF GROWTH HORMONE ON PROSTATIC CARCINOMA

3-day Period	Growth Hormone mg./day	Urine Calcium mg./day	Serum Acid Phosphatase K.A. Units
1		162	13.3
2		166	16.2
3		152	
4	100	215	17.2
5	200	217	
6		287	19.1
7			13.5

ment of purer hormonal preparations, the role of growth hormone in malignant diseases, diabetes mellitus and normal growth can be more clearly elucidated.

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Summary

during administration of growth hormone, the data is too meager to permit any conclusions as to the efficacy of growth hormone in the therapy of pituitary dwarfism or children of short stature.

The pituitary gland is increasingly important in the control of the growth rate of certain malignancies. The improvements in advanced breast and prostate cancer as the result of the administration of estrogens and androgens have been postulated to be the result of pituitary gland suppression, or a "chemical hypophysectomy." The administration of growth hormone to a woman with breast cancer previously hypophysectomized induced osteolysis as measured by an increase in urinary calcium excretion.¹⁰ This osteolysis is interpreted as due to an increased rate of tumor growth. Growth hormone administered to a patient with metastatic prostate cancer resulted in increased pain, increase in serum acid phosphatase, and increase in urinary calcium excretion (Table II). Cessation of therapy was followed by a reversal of these changes. It was to be expected that total surgical hypophysectomy would be employed in the management of advanced cancer of the breast and prostate. Numerous reports to date^{11,12} demonstrate that in selected patients striking regressions of metastatic tumors have occurred as a result of surgical hypophysectomy. The improvements noted are in part the result of deprivation of growth hormone.

The procedure of surgical hypophysectomy has also been employed in an attempt to control severe diabetes mellitus and forestall the development of secondary complications of this disease. In view of the role of growth hormone in carbohydrate metabolism, it is not unexpected to find a decrease in insulin requirements and a decrease in hyperglycemia and glycosuria following hypophysectomy. The early investigative experience in this disease suggests that improvement in some advanced vascular lesions can also be expected. These studies demonstrate that the regulation of diabetes mellitus by insulin and diet are not the only factors involved in the control of this disease. Further research is being directed toward the pituitary factors.

Growth hormone affects fundamental metabolic processes of protein, carbohydrates, fats, minerals and various enzyme systems. With the develop-

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DIFFERENTIAL DIAGNOSIS OF LYMPHOCYTOSIS AND LEUKEMIA

Lymphocytosis

Lymphocytosis occurs in a wide variety of conditions. Differential diagnosis ultimately depends upon qualitative changes in lymphocytes, but knowledge of the scope of the diagnostic possibilities is useful. Briefly, the following principles can be defined.

Infants from two weeks to two years of age generally show a normal "lymphocytosis," and they may respond to infections with minimal lymphocytosis rather than neutrophilia. A source of concern is the fact that their large lymphocytes may contain visible nucleoli. These are not of diagnostic importance.

Viral and other diseases associated with a tendency toward leukopenia often show a relative lymphocytosis. Lymphocytes may show leukotoid alterations comparable to those of infectious mononucleosis. This fact makes it difficult to diagnose with security the leukopenic phase of infectious mononucleosis.

In infants and young children, extremely high lymphocyte counts occur in two conditions other than leukemia. One, namely, infectious lymphocytosis, is characterized by a monotonous increase in the number of mature small lymphocytes. The lymphocytosis persists from three to seven weeks; as the percentage of lymphocytes decreases, the percentage of eosinophils increases. Rarely, the predominant lymphocyte is a medium-sized cell. The bone marrow may show a similar lymphocytosis, with 40 to 45 per cent lymphocytes. The second condition, namely, pertussis, shows a lymphocytosis comprised of cells that are more variable in size and morphologic structure. A few lymphocytes show leukocytoid alterations and

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a few may be immature, but most are normal lymphocytes, and the variability in the morphologic aspects of the cells does not approach that of infectious mononucleosis. When the total leukocyte count is less than 65,000 cells per cubic millimeter, infectious mononucleosis becomes important in differential diagnosis.

Leukemia

General findings in lymphatic leukemia are simpler to delineate than are those in benign lymphocytosis.

Chronic lymphatic leukemia, a disease of adults, is characterized by a monotonous increase in mature lymphocytes of similar size and structure. Total counts vary from the normal range to more than 1,000,000, with very high percentages of lymphocytes, but symptoms and signs need not vary accordingly. Immature lymphocytes are not prominent, but many smudged or damaged lymphocytes are found in either blood or bone marrow. Lymphoblasts are almost never seen. The cells resembling blasts are reticular lymphocytes comparable to those of infectious mononucleosis or benign hyperplastic nodes. Biopsy of the bone marrow is helpful in diagnosis. Here, too, the monotonous picture of lymphocytosis exists; lymphocytes vary from 20 to 90 per cent, with an average of 60 per cent. If the relative and absolute numbers of lymphocytes are low in both blood and marrow, sections of the aspirated marrow often are needed to establish the diagnosis.

The various forms of subacute and acute lymphatic leukemia offer the most confusion because they are common in infants, children, and young adults, the same age range in which infectious mononucleosis also is most common. If anemia and thrombocytopenia have not yet become profound, the clinical findings in these leukemias may mimic those of infectious mononucleosis. The extreme malaise, the hyperpyrexia, and the nature

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of the pharyngitis in infectious mononucleosis often make the patient who has infectious mononucleosis seem a much more likely candidate for imminent death than the patient with acute leukemia. Total leukocyte counts in subacute or acute lymphatic leukemia vary from leukopenic levels to considerably more than 200,000. Cells of the lymphocytic series dominate the differential count. The general appearance of these cells is monotonous insofar as similarity in size is concerned. Lymphoblasts, immature lymphocytes and mature lymphocytes are present. Acute leukemias have 60 per cent or more lymphoblasts; subacute leukemias have less than 60 per cent lymphoblasts. The lymphoblast is the cell that is essential to the diagnosis of acute and subacute lymphatic leukemia. It is abnormal in the peripheral blood and lymph nodes; it is not present in benign lymphocytoses. The immature lymphocyte, a cell that resembles the lymphoblast in size and paucity of cytoplasm but that ordinarily lacks nucleoli, occurs in large numbers in the acute and subacute lymphatic leukemias; it is also found in normal lymph nodes and bone marrow and, occasionally, in normal blood as well as in lymphocytoses. The similarity of the immature lymphocyte to the lymphoblast is responsible for much confusion in differential diagnosis. The bone marrow in either acute or subacute lymphatic leukemia contains high percentages of lymphoblasts, immature lymphocytes and mature lymphocytes, the average being 95 per cent. Study of bone marrow is particularly useful in diagnosis in the cases with normal or leukopenic peripheral leukocyte counts.

Infectious Mononucleosis—Lymphatic Reaction

The lymphocytosis of infectious mononucleosis probably remains confusing because no two cases are alike. The combination of the clinical findings and numerous lymphocytes with large amounts of blue cytoplasm and nuclei that occasionally have visible nucleoli is often alarming. Several features deserve emphasis. Anemia and thrombocytopenia are generally absent. The leukocyte count may vary from 2,000 to 65,000 but the usual values are between 8,000 and 25,000. Percentages of lymphocytes range from 25 to 85, but diagnosis is difficult if the percentage is less than 50. Of

utmost importance is the variation in size and structure; there is no monotony in the lymphocytic picture. Often the largest and bluest cells in the blood film contain nucleoli and resemble some blast form. These, the reticular lymphocytes (type III, Downey), are normal precursors of lymphocytes. They generally comprise only a small percentage of the lymphocytes. The majority of the lymphocytes show leukocytoid changes. Downey's type II or type I leukocytoid lymphocytes or both are present, and otherwise normal-appearing lymphocytes may have excessive azurophilic granulation or cytoplasmic basophilia. Occasional plasma cells are also seen. Because the fragile cytoplasm of the type II lymphocytes is often distorted, these cells may assume polygonal shapes. Often there is an absolute as well as a relative neutropenia, and occasional neutrophilic promyelocytes and myelocytes are found. Bone-marrow biopsy is not necessary for diagnostic purposes in most cases. Percentages of lymphocytes in the marrow range from 12 to 43, with an average of 25; about half of the lymphocytes in the marrow show leukocytoid changes, and evidence of formation of these cells in the marrow is present. About 40 per cent of the sections of aspirated marrow in infectious mononucleosis show small granulomatous lesions as well as foci of developing lymphocytes.

When high percentages of lymphocytes show leukocytoid changes, the condition is called a "lymphatic reaction." The changes in individual lymphocytes are comparable to toxic changes in neutrophils, and also they generally indicate stimulation of lymphatic tissue. Unless the lymphatic reaction is of considerable magnitude, its diagnostic importance is questionable. Lymphatic reactions can occur in infectious mononucleosis, brucellosis, infectious hepatitis, German measles, serum sickness, sepsis, viral diseases and agranulocytosis, and with eosinophilia. Plasma cells may also be present in any of these conditions. High percentages of plasma cells are seen in German measles, hepatitis and serum sickness. A blood picture indistinguishable from that of infectious mononucleosis is seen in very occasional cases of brucellosis and infectious hepatitis, so it should be remembered that morphologic studies alone will not exclude the latter conditions.



THE PRESENT STATUS OF THE TREATMENT OF VARICOSE VEINS

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The existence of different types of treatment for a disease makes it seem likely that none is completely satisfactory. This appears to be true of varicosis of the veins of the lower extremities.

There has been some progress made in the past few years, both in an improved understanding of the etiology as well as in the treatment of superficial varicosis of the lower extremities. Aside from inherent structural weakness, degeneration with age or trauma secondary to over-distention (as a result of deep vein obstruction) and hormonal changes, there is an increasing interest of late in the rôle of arteriovenous connections as an abetting factor in the development of varicoses. It is reasonable to assume that elements of more than one etiological factor may be responsible and at times in the same patient.

In a dilated vein, the valves cannot function efficiently. Approximation of the vein walls to one another by pressure from without is the basis for restoration of valve function and resolution and control of signs and symptoms. Elastic bandages or stockings are therefore still acceptable and popular forms of treatment. When the valve structures are destroyed or for some reason treatment with elastic support alone is unsuccessful, then functional or anatomical elimination of the incompetent and inefficient veins is indicated.

At the present time, ligation and intraluminal stripping are the most popular methods of treatment. The results are gratifying, especially in regard to the removal of some large superficial saphenous veins.

There is no doubt that by this technique one removes some of the diseased veins. On the other hand, there seem to be at least two misconceptions associated with this form of treatment. One is that the connections with the perforating or communicating veins are disrupted. This is anatomically unlikely in most instances. The superficial

veins often connect with the perforating or communicating veins by numerous and devious channels. The direct connections so often shown in simplified diagrams between the saphenous itself and the deep veins are actually infrequent. Another is that stripping gives an outstandingly better end result as far as future varices is concerned. In this author's opinion, it still remains to be proven that the results of stripping are appreciably better in all or even most instances than with adequate high and serial ligations. The enlarged long or short saphenous veins often become indiscernible within eight months after high ligation. It is true that the extremely tortuous, dilated varicosities will tend to persist after high ligation alone. But these are also the varicosities that are almost impossible to strip out.

There is no comparison between the morbidity of simple and serial ligations to that following stripping. It would not be surprising to see the procedure of vein stripping gradually lose popularity in favor of a return to simple high and serial ligations. With an adequate high ligation at the sapheno-femoral junction, the results after eight months, in this author's series, are very gratifying and appear to be comparable to those in patients with vein stripping.

The procedure of high ligation with retrograde injection, previously and still championed by McPheeters,¹ is now infrequently done. As shown by Wright, et al,² the sclerosing agent goes almost entirely into the deep veins. Here it can and probably does cause an appreciable amount of damage to valves and endothelium.

Abraham³ has recently described the method of high ligation and the insertion of a silk suture into the distal vein to obliterate it. We have evaluated his technique, using both silk and catgut, and have found it to have about the same postoperative morbidity as vein stripping.⁴ However, the actual

trauma and blood loss were much less than with the stripping technique. It has another advantage in that it can be done under local anesthesia.

Superficial varices remaining eight months after any of the above procedures are best obliterated by the airfoam injection technique described by Meyers of the Mayo Clinic.⁵ A small amount of sclerosing solution (we use 3 per cent sodium sotradecal*) is mixed with about three times as much air to make a foam. This foam is injected into the vein with the patient in the reclining position. The air foam gives a great deal of endothelial contact without the presence of much blood. This leads to a sclerosis without a large thrombus and thus a finer and incidentally less painful end result.

The surgical treatment of varices during pregnancy can be accomplished without any greater morbidity than in nonpregnant individuals.⁶ There is some risk nonetheless. The fact that such veins return to normal in most individuals within eight months after parturition, makes surgical treatment unnecessary in such instances. With succeeding pregnancies, the unresolved disease tends to increase. When such disease is symptomatic after eight months postpartum, then we believe surgery is indicated. Occasionally the discomfort is so great and the nature of the vessels an actual hazard, that in such instances surgical treatment during pregnancy is indicated.

The hormone treatment of symptomatic varicosis in pregnancy, as proposed originally by McCausland,⁷ has not gained widespread popularity. However, other authors have reported good results with this method⁸ and McPheeters is still using it.

For the most part, conservative treatment, including elevation of the foot of the bed, good elastic support when up, avoidance of prolonged sitting and prolonged standing and daily walks are this author's method of choice for the treatment of the varicosities of pregnancy.

Ligation of the superficial femoral vein, as recommended originally by Buxton, et al.,⁹ while still done for the stasis syndrome is not very popular. In the individual whose activities do not demand rapid or persistent walking, deep vein ligation may still have a place and can be expected to give some relief.

Popliteal vein ligation, popularized by Bauer¹⁰ has fallen by the wayside. It is interesting that my colleague, Dr. Thomas O. Murphy, in thirty-two

phlebographic studies on patients who had had popliteal vein ligations for the stasis syndrome found a popliteal vein of appreciable size visualized in all.¹¹ Either these patients had only one of two popliteal veins ligated or else a smaller collateral became dilated as a result of the popliteal occlusion. Most of the patients in our clinics who have had popliteal vein ligations for the stasis syndrome have returned with their old symptoms within one year.

The recent advances in phlebographic methods^{12,13} have brought with them the documentation of varicosis of the deep and communicating veins in limbs presenting the stasis syndrome. They have also established the fact that in the post-phlebotic limb the deep veins are usually patent although incompetent. This makes treatment by ligation, removal or obliteration of incompetent superficial veins a reasonable procedure in such limbs, whereas it was formerly thought to be an extremely hazardous undertaking.

These phlebographic studies have also brought out other possible etiological factors in the production of the stasis effect in the lower extremities. These techniques have resulted, in our experience, in a better control of surgical procedures for the ligation of communicating or perforating veins.¹⁴ One can hope that these and improved methods of visualization of the deep veins will lead to further and better methods of treatment of the disorders of the veins of the lower extremities.

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*Wallace and Tiernan

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CASE PRESENTATION

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A FORTY-ONE-YEAR-OLD clerk was admitted April 1 complaining of epigastric pain for one month. For nine years he had suffered from periodic episodes of epigastric distress, usually in the spring and in the fall. He had been examined roentgenographically on several occasions and told that there was no evidence of peptic ulcer and that he had a "nervous stomach." He had experienced no severe distress until the past month, during which time he had sharp pain across the epigastrium. The pain did not radiate; it was severe and frequently awakened him at night. Gelusil and milk accorded much relief. He vomited occasionally, which seemed to relieve him. He had noted no hematemesis nor melena. He had lost about 15 pounds in weight.

He had used alcoholic beverages freely for a few years but very little in the past eleven years. He had been treated for syphilis twelve years ago and was retreated several years later.

He was well developed, thin and in no acute distress. The temperature was 99.4° F., the pulse rate 82, the blood pressure 124 mm. of Hg systolic and 82 diastolic. The heart and lungs were normal to percussion and auscultation. There was slight epigastric tenderness and a succussion splash was heard over the stomach.

The hemoglobin was 13.5 gm. per 100 cc., the leukocyte count 15,700 (73 per cent neutrophils, 23 per cent lymphocytes, 2 per cent monocytes, 1 per cent eosinophils, 1 per cent basophils), the sedimentation rate was 50 mm. in one hour. The blood urea nitrogen was 13.5 mg. per 100 cc., the chlorides 92.7 mEq./l., Co_2 30.2 mEq./l., and potassium 4.5 mEq./l. Total serum protein was 6.8 gm. per 100 cc. (albumin 5, globulin 1.8). The urine specific gravity was 1.028, negative for albumin, faint trace of sugar, sediment contained 1 to 2 leukocytes per high power field. Fasting blood sugar was 91 mg. per 100 cc. The stool was negative for occult blood. The VDRL slide test was negative. Gastric analysis showed 52 units of free acid, 78 units of total acid. The serum amylase was 80 units. The serum bilirubin was 0.2 mg. per 100 cc. at one minute, the total being 1.0 mg. per 100 cc. There was 1.8 per cent retention of bromsulphalein at forty-five minutes, prothrombin was 84 per cent, cephalin flocculation negative, thymol turbidity 6 units.

A PA film of the chest was normal. An upper gastrointestinal series revealed a large penetrating ulcer of the antrum or of the first portion of the duodenum with obstruction to the outflow of barium.

He improved on continuous gastric suction and parenteral alimentation. However, he was unable to tolerate an ulcer No. 1 regime on several occasions when

he had repeated vomiting and bedtime gastric aspirates measured 1500 cc. On April 8 a transfusion was discontinued because of a generalized erythematous eruption. Plasma hemoglobin and blood culture were negative. On April 12 he received 500 cc. of whole blood when only slight urticaria was noted.

At operation on April 13 there was a large duodenal ulcer penetrating into the head of the pancreas. A gastric resection was done with a Billroth II type of reconstruction leaving the ulcer bed *in situ*. Procaine penicillin 300,000 units daily was administered, and dihydrostreptomycin 500 mg. every six hours was begun. His condition that day remained satisfactory.

The following morning his rectal temperature was 103.5°, pulse rate 96 and blood pressure 70/30 mm. of Hg. The hemoglobin was 15.9 gm. per 100 cc., the serum amylase was 135 units. The blood pressure stabilized at 120/78 after administration of 600 cc. of plasma and 500 cc. of whole blood. The temperature remained elevated, and that evening his blood pressure fell to 65/40 mm. of Hg. Intravenous administration of vasoxyl was instituted and the blood pressure ranged about 102/56 mm. of Hg. An indwelling catheter was introduced because of retention. Urine output was satisfactory.

The second day following surgery his rectal temperature ranged from 103.5° to 106° F. Administration of vasoxyl was continued and the blood pressure ranged between 70/50 and 110/60 mm. of Hg. The abdomen was soft, there was no unusual tenderness, few bowel sounds were heard. Urine output was adequate. The hemoglobin was 14.7 gm. for 100 cc., the leukocyte count 4,700 per cu. mm. with 72 per cent neutrophils and 28 per cent lymphocytes. The serum amylase was 60 units. Multiple films of the chest were negative. Flat and lateral decubitus film of the abdomen showed gas in the large and small bowel and some mottling over the upper quadrant. He received 300 cc. of plasma. Intravenous administration of terramycin 250 mg. every six hours was added to his therapeutic program. His urinary output remained adequate. The urine specific gravity was 1.023, albumin 3+, a trace of sugar, the sediment contained a full field of leukocytes and 70 to 75 erythrocytes per high power field.

On the third postoperative day his condition was unaltered. There was some swelling about the lips and a generalized erythematous eruption with urticarial wheals which improved upon administration of Benadryl. He received 500 cc. of plasma. The rectal temperature was 105° F. Levophed was now employed and the blood pressure ranged from 80/70 to 100/70. He had a large watery stool which did not appear to contain blood. On this day a second operation was performed.

Discussion

DR. W. E. JACOBSON: The protocol in this case supplies us with an abundance of information to substantiate the diagnosis of a large penetrating duodenal ulcer and

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Dr. Jackson is from the St. Louis Park Medical Center, and Dr. Smith is from the Veterans Administration Hospital.

leaves no doubt as to the wisdom of having advised surgical therapy for this patient's original disease. The preoperative information otherwise merely defines a relatively normal forty-one-year-old man. There was moderate hypochloremia and mild alkalosis probably related to the high degree of pyloric obstruction with vomiting. For reasons that are not well described he received blood preoperatively even though the hemoglobin is recorded as 13.5 grams per 100 cc. The transfusion was complicated by what seems to have been an allergic transfusion reaction. There is nothing to indicate that this was a hemolytic transfusion reaction.

The major problem began twenty-four hours postoperatively and was manifested in the simplest analysis by the development of hypotensive shock and fever. The differential diagnosis must therefore include all postoperative complications capable of producing rather severe shock and significant fever. The postoperative complications must include diseases which might develop coincidental to the postoperative period and yet not be directly related to the operation itself. In attempting to unravel this problem, I have elected to consider the various causes of shock. The first obstacle to this approach lies in the fact that there is no clear-cut classification of shock. From a purely physiological, pathological aspect, all cases of shock are characterized by oligemia, by reduced peripheral resistance or by both. Therefore, it is necessary to consider the causes of shock from a purely clinical standpoint. I have chosen five major conditions which could be the cause of shock. These are (1) hemorrhage, (2) administration of fluids or drugs, (3) operative complications, (4) overwhelming infection, and (5) other medical diseases or complications. Although there might be disagreement and disapproval as to this classification there would certainly be complete unanimity of opinion relative to the immediate need for determining whether the shock was secondary to hemorrhage. According to the work of Emerson and Ebert¹ during the second World War, it is apparent that approximately 40 per cent of the blood volume must be lost in order to produce acute hemorrhagic shock. It is obvious from this protocol, including the data relative to the patient's fluid replacement and the multiple recordings of hemoglobin over several days, that he did not lose any large amounts of blood either at the operation or in the postoperative period. Therefore, I believe that we can immediately dismiss the factor of hemorrhage as producing the shock and complications noted in this patient.

I will turn next to the question of shock secondary to the administration of drugs and fluids. Drugs are capable of producing shock as a result of one of three factors, namely, (1) a primary hypotensive effect of the drugs, (2) the production of an acute anaphylactic reaction, and (3) the production of a delayed hypersensitivity reaction of the serum sickness type. Hexamethonium and related drugs are common examples of substances capable of producing marked hypotension and shock. This patient did not receive any drugs ordinarily considered markedly hypotensive in their effect. The matter of acute anaphylaxis also seems ex-

tremely unlikely. The patient's reaction was delayed at least twenty-four hours, and also he maintained an adequate urine output during his entire postoperative course. Delayed hypersensitivity reactions of the serum sickness type, a common example of which is the penicillin reaction, is most frequently manifested by the delayed development of urticarial skin lesions, fever, arthritis and often gastrointestinal symptoms. Although shock is not a common manifestation of the delayed hypersensitivity reaction it may occur and I can recall one patient with profound collapse occurring during a severe penicillin reaction. There are, however, numerous reasons for excluding the hypersensitivity reaction of this type as the cause of this patient's postoperative manifestations.

The administration of fluids including blood may produce shock as a result of the infusion of potent pyrogens, as a result of bacterial contamination of the fluid or as a result of a hemolytic reaction. I will discuss the matter of bacterial contamination subsequently but at this time would believe that we could exclude either a severe pyrogenic reaction or a hemolytic transfusion reaction. The maintenance of an adequate urine output is the strongest single factor to consider in this regard. Of course, the lack of an elevated plasma hemoglobin further helps to exclude the possibility of a hemolytic transfusion reaction.

I probably would be prudent to omit entirely any discussion relative to postgastrectomy surgical complications capable of producing this picture. This requires a considerable knowledge of the technical aspects of the surgery which I am not at all prepared to discuss. However, I shall mention three things that come to mind, namely, (1) blowout of the duodenal stump, (2) ligation of a major artery at the time of surgery and (3) the development of a closed loop obstruction in the immediate postoperative period. I believe that the factor of time tends to exclude the possibility of a blowout of the duodenal stump. It is my understanding that this complication usually occurs about the fourth to the fifth postoperative day, and that it is relatively uncommon during the first twenty-four hours. The surgeons, I am sure, will object to the insinuation that they might during gastrectomy inadvertently ligate a major artery. However, I have considered three possibilities: (1) the middle colic artery, (2) the left hepatic artery, and (3) the celiac artery. I do not believe that ligation of any of these vessels would produce the picture noted in the postoperative period as recorded in this protocol. I have been told that one may ligate the middle colic artery without the development of arterial insufficiency and gangrene of the bowel. Ligation of the other two vessels might be expected to be more serious but not result in this clinical picture.

The possibility of a closed loop obstruction must however, be more seriously considered. In using the Billroth II operation, I believe it is common custom for the surgeon to place the tip of the gastric tube into the duodenal loop in order to maintain constant drainage and prevent the complication of a closed loop obstruction. It would be well to know at this time

whether the gastric drainage in the postoperative period was bile stained.

DR. RALPH SMITH: The drainage was bile stained.

DR. JACOBSON: The presence of bile in the drainage fluid would appear to be the best proof that this was not a closed loop obstruction.

Severe overwhelming infections are not infrequently associated with the development of significant peripheral vascular collapse and shock. Actually the clinical manifestations of fever and shock presented by this patient strongly suggest the possibility of some severe complicating infectious process. A bacteremia usually complicates the infection in circumstances resulting in shock. Among the more common clinical infections capable of producing shock one must include pneumonia with bacteremia, meningococcemia, and urinary tract infections with associated bacteremia. Any of the coliform organisms capable of causing an acute pyelonephritis may result in bacteremia with fulminating shock and high fever. One must also consider the possibility of whether this patient received fluid or blood grossly contaminated with bacterial organisms. As you may already know, there have been reported by local authors at least two cases of acute fulminating shock and high fever associated with the transfusion of contaminated blood. In both of these cases the organism was a Gram-negative bacteria. The clinical picture has been well described by Borden and Hall.² The clinical state was one of immediate fever, shock and severe oliguria. This patient did not present this classical picture. I do not believe that there is evidence to suggest that he received contaminated blood; however, I cannot exclude the possibility of some other type of severe infection producing the picture of shock and high fever manifested by this patient.

In the final category I attempted to think of some other medical disease or medical complication capable of producing this syndrome. I considered two possibilities, (1) myocardial infarct and (2) acute pancreatitis. I think that it is wise whenever dealing with the problem of unknown shock to exclude the possibility of an acute silent myocardial infarct. I should like to ask, therefore, whether electrocardiograms were done on this patient during his postoperative period.

DR. RALPH SMITH: There were no electrocardiograms taken.

DR. JACOBSON: The absence of an electrocardiogram makes it more difficult to exclude the possibility of a myocardial infarct; however, I believe that we can rely on the clinical picture. It certainly would be unusual for an acute myocardial infarct to be manifested by fever of 103° to 105°, no pain and intermittent shock. For these reasons I shall eliminate this possibility for purposes of further discussion.

The development of an acute severe hemorrhagic pancreatitis during the postoperative period might adequately explain this patient's entire clinical course. It is known that this patient had a large duodenal ulcer and that preoperatively this had penetrated and probably to

some degree had produced an associated pancreatitis. It is not unlikely, therefore, that this process could become acutely worse in the immediate postoperative period and result in a fulminating necrotic hemorrhagic pancreatitis.

The first question that comes to mind is, "How can one make a diagnosis of acute pancreatitis in view of the normal serum amylase?" In the usual case of acute pancreatitis the amylase will rise within the first twenty-four hours and will return to normal within three to ten days. The one exception to this rule is acute hemorrhagic pancreatitis in which there may be a transient rise during the first eight to twelve hours and then the serum amylase rapidly falls to normal and in some cases may fall to abnormally low values. It is not unusual in acute necrotic hemorrhagic pancreatitis to find values less than 50 units in the first twenty-four hours after the onset of the attack. It is well known that the elevation of the amylase is not correlated with either the severity nor the prognosis of acute pancreatitis. The elevation of the amylase in pancreatitis depends upon the release of pancreatic enzymes from the injured tissue into the circulation. If the gland is rapidly and completely destroyed and if there is associated thrombosis of the pancreatic and splenic vessels, it is readily apparent that there will be no release of pancreatic enzyme into the general circulation. On the other hand, cases of moderate necrosis may have high levels and the high levels may remain elevated for weeks after the acute symptoms subside.

The next question challenging this diagnosis is, "How can one make a diagnosis of acute pancreatitis in a man who has a soft abdomen with no unusual tenderness?" My only answer to this question is that this patient obviously has some fulminating intra-abdominal condition, and while it is unlikely in pancreatitis to have a non-tender soft abdomen, it would be equally unlikely in any other situation which I could consider. Furthermore, I have seen one previous patient who following a gastrectomy for carcinoma of the stomach developed a delayed renal shut-down which subsequently resulted in his death. During the entire postoperative period the patient had a soft, non-tender abdomen and yet at autopsy had a rather severe pancreatitis.

There are two studies which might have helped to shed further light on the possibility of this being acute hemorrhagic pancreatitis. First, we would expect in a patient with this complication some degree of peritoneal fluid, although not massive ascites. If some of this can be obtained by needle aspiration the determination of amylase value on the fluid may be extremely helpful in making the diagnosis of hemorrhagic pancreatitis. Even though the blood value may be low, the value in the secretion within the peritoneal cavity may exceed 500 to 1,000 units. Secondly, it is of extreme value to determine the serum calcium. This determination has its greatest value in the diagnosis and prognosis of pancreatitis in cases such as I would expect this to be, namely, acute hemorrhagic pancreatitis with the development of multiple fat necrotic areas throughout the peritoneal cavity. Under such circumstances, the serum calcium almost universally falls rapidly and falls to

values of 7 mg. per cent or less. This determination, unlike the serum amylase, is directly related to the severity of the disease and is to some degree related to the prognosis. The lower the serum calcium value, the more likely the patient is to succumb to the acute pancreatitis. There is one other determination which might have been of some value, namely, the determination of the blood sugar level during the postoperative period. In patients with severe pancreatitis moderately severe hyperglycemia may develop.

In conclusion, I should like to state that I have reached this diagnosis probably more by intuition than by logic. The development of a severe pancreatitis might well constitute adequate grounds upon which the pathologists might justify their requesting an internist to discuss a "surgical case." I cannot exclude some overwhelming infection but am at a loss to more clearly define such a process and therefore will rest my differential discussion with the diagnosis of acute hemorrhagic pancreatitis.

DR. SMITH: Thank you, Dr. Jacobson. Are there any questions or discussion from the audience?

MEMBER OF AUDIENCE: I would like to suggest the possibility of infarction of the greater omentum which is usually left intact in the operation for benign ulcer.

MEMBER OF AUDIENCE: Another possibility in a case such as this, with a large penetrating ulcer, is erosion into the common bile duct, leading to an overwhelming ascending cholangitis.

MEMBER OF AUDIENCE: I find it difficult to believe that this is an acute pancreatitis in view of the leukopenia which is present.

DR. JACOBSON: As far as the leukopenia is concerned, all I can say is that whatever condition this patient has, the leukopenia will probably be difficult to explain. It is not uncommon, however, for many overwhelming inflammatory processes to result in a leukopenia.

DR. GLEASON: We had a lengthy discussion while we were preparing the protocol for this case, as to whether to carry the history through to the death of the patient, or not. I suppose this may be criticized but we finally decided to interrupt the history where we did to provoke more discussion.

The operation which was performed was an exploratory laparotomy, done to evaluate some of the possibilities which Dr. Jacobson has discussed. There were about 200 cc. of blood-tinged fluid in the peritoneal cavity. The liver appeared somewhat darker and softer than usual but did not appear to be infarcted. All of the suture lines were intact and the anastomoses were patent. Exploration revealed only moderate distention of the small intestine, with no mechanical obstruction. There was no evidence of any localized nor generalized peritonitis. The pancreas appeared normal.

The patient remained in approximately the same general condition, with persistent vascular collapse,

cyanosis, rapid pulse and rapid, shallow respirations. No other unusual signs or symptoms intervened, but the patient expired approximately twenty-four hours after the second operation.

DR. SMITH: Dr. Jacobson, would you care to make any further remarks, in the light of this additional history?

DR. JACOBSON: No thank you. I'll just sit back and listen.

DR. M. BARRON: Well, in order to defend Dr. Jacobson, I would like to ask why the surgeons thought it was necessary to operate. I didn't think it was pancreatitis but I didn't know what in the world it was. But what was the indication for operation?

DR. E. FLINK: I might add a word about that. Nothing that was being done seemed to be doing any good. The internists who were consulted on this case didn't have any good ideas, either. One thought that this was a Gram-negative bacteremia related to the indwelling catheter and one of the purposes of the operation was to do a cystostomy. The bladder was found to be quite normal. The hope was to find something that could be corrected.

QUESTION FROM AUDIENCE: Were blood cultures taken?

DR. SMITH: Several blood cultures were taken and were negative.

QUESTION FROM AUDIENCE: Were stool cultures taken?

DR. SMITH: They were taken but had not been reported on before death.

Autopsy Findings

DR. GLEASON: The heart and lungs were quite normal. The significant pathology was limited to the abdomen. There were 2,500 cc. of clear, straw-colored fluid in the peritoneal cavity. The peritoneal surfaces were smooth and glistening, with no evidence of peritonitis. The small intestine was of a peculiar rusty brown color, darker than normal. All of the operative sites were in good condition. There was only mild submucosal edema and hemorrhage in the inverted duodenal stump. The opened small intestine appeared normal to a point about two feet from the gastric anastomosis. Beyond this point the wall of the intestine was much thinner and softer than normal. The mucosa appeared to be absent and was represented by a practically complete, soft greyish white tubular cast lying free in the lumen of the intestine (Fig. 1). The entire small intestine was also moderately distended by a thin, cloudy, greenish gray liquid. No other abnormalities were found in the remainder of the examination.

Microscopic examination of the involved intestine revealed complete loss of the mucosal layer, leaving the muscularis mucosae practically intact, and there was

only a mild subacute inflammatory reaction at the surface and extending a short distance into the submucosa, and a thin layer of inflammatory granulation tissue on the denuded surface.

and very severe shock. The usual case, of course, also presents a severe, watery diarrhea, which, however, may fail to manifest itself before death. It is this enormous loss of fluid and electrolytes into the lumen of the

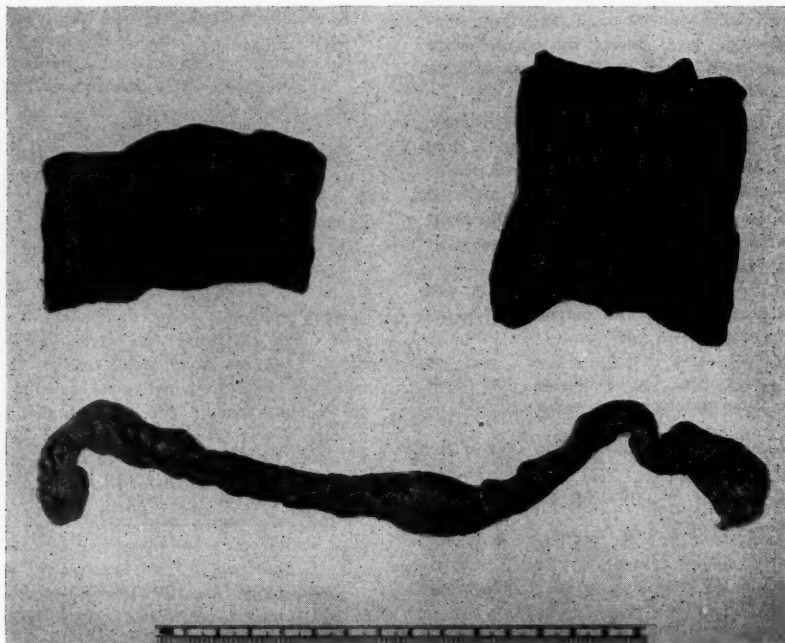


Fig. 1. Two segments of the small intestine, completely denuded of mucosa, and a portion of the soft cast found within the lumen of the small intestine.

Sections of the mucosal cast revealed that it consisted of an amorphous layer of fibrin and necrotic material in which there were embedded many mononuclear and polymorphonuclear leukocytes. During the last day of life rectal swab material had been cultured, at the instigation of Dr. Lyle Hay, who suggested the correct diagnosis. These were streaked on ordinary chocolate agar. As seen in Figure 2, there grew out an almost pure culture of an organism which was found to be a hemolytic staphylococcus aureus, coagulase negative. Only very few colonies of other bacteria were present on the slide. With this information, we went back to our microscopic material, and at only one point, on the inside of the tubular cast, could we find some of the luminal content adherent to the cast. In this there were numerous staphylococcal forms, sometimes in solid masses.

Our final diagnosis in this case is, of course, the syndrome of a staphylococcus enteritis causing a pseudomembranous ulcerative enteritis.

This is a condition which is not new. It was described in the American literature as long ago as 1893, as an occasional complication of gastroenterostomy for peptic ulcers. It is usually manifested clinically by what appears to be an acute peritonitis, with pain and swelling of the abdomen, nausea, vomiting, high fever

and very severe shock. The usual case, of course, also presents a severe, watery diarrhea, which, however, may fail to manifest itself before death. It is this enormous loss of fluid and electrolytes into the lumen of the

bowel in addition to the toxemia of the bacteria themselves, which causes the profound shock. Good analogies have been drawn between this syndrome and Asiatic cholera, and the same heroic water and electrolyte administration is required in the syndrome under discussion. The pathogenesis of pseudomembranous ulcerative enteritis was unknown until recent years. Attempts to identify a causative organism were hampered by the use of selective media for the known pathogens, until it was finally appreciated that many of these patients had practically pure cultures of staphylococci in the intestinal content which were repressed by the selective media. The prevailing views now suggest that the staphylococcus comes to predominate in the intestinal flora when the normal conditions are disturbed by several factors, among which may be included intestinal obstruction, abdominal surgical procedures, many chronic disabling illnesses, and very probably the administration of various antibiotics which do not repress the staphylococci, or from the action of which the staphylococci may subsequently "escape."

It should be emphasized that this disease is not analogous to the bacillary dysenteries, in which much of the disability is due to tissue and blood stream invasion and liberation of endotoxins. It is more closely

analogous to staphylococcal food poisoning in which preformed staphylococcal exotoxin is ingested in contaminated food and causes a violent gastroenteritis, while the staphylococci themselves do not invade the tissues, and in fact, do not even survive. In the present syndrome, however, the staphylococci are actually living within the lumen of the bowel and produce their potent exotoxins there. The pseudomembranous ulceration of the mucosa is probably produced by the direct action of these toxins and not by the organisms themselves.

I would like to say on behalf of the laboratory that you must be careful how you present this material to your bacteriologist if you suspect this staphylococcal enteritis. Do not ask him to culture for enteric pathogens. The highly selective media inhibit the growth of staphylococci. Do not ask him to "culture for staphylococci." He may use a selective medium for staphylococci. Almost all fecal material contains appreciable numbers of staphylococci. It is essential to establish that the staphylococci are the *predominant* organism. Examination of a direct smear may give strong confirmation of your suspicion if the smear is loaded with staphylococci. The material should be streaked on ordinary blood or chocolate blood agar and examined for the predominant organism.

Sensitivity studies should be carried out promptly. Treatment of the water and electrolyte problem should be instituted immediately, but an antibiotic must be found which will control the staphylococci. In our case, the organism was resistant to all the antibiotics which were being used, but it was sensitive to erythromycin, which incidentally is probably the antibiotic of choice in this community in which staphylococci resistant to other antibiotics are rapidly increasing in numbers.

Finally, it should be noted that some apparently identical cases of this syndrome have failed to yield staphylococci, and other organisms may apparently cause a similar enteritis.



Fig. 2. Photograph of the chocolate agar culture of the rectal swab. Practically pure culture of staphylococci.

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THREE PER CENT OF AIRLINE PASSENGERS ARE AMBULATORY PATIENTS

An estimated 3 per cent of all passengers flown by regularly scheduled U. S. airlines pose a unique problem for transportation officials and physicians—unique because they are ambulatory patients who must travel as ordinary passengers.

Maj. Gen. Harry G. Armstrong, U. S. Air Force surgeon in Wiesbaden, Germany, discusses "Air Travel and the Ambulatory Patient" in the current *International Forum*, a supplement to *Therapeutic Notes* published for physicians by Parke, Davis & Company.

"During 1954, it is estimated that approximately 1,000,000 of the 34,500,000 passengers flown by the regularly scheduled airlines of the United States were suffering from some disease or disability," he says.

Gen. Armstrong writes that the figure shows physicians are constantly being asked to advise their patients on the effects of air travel. He adds that "all clinicians should be fully qualified to deal with this subject."

Health laws and transport regulations, flight safety, and the possible effects of aerial environment on the patient, he explains, all are factors which must be considered by both the physician and the airlines.

Because of strict Civil Air Regulations, Gen. Armstrong says, "We can predict fairly accurately the type and degree of deviation from normal to which a patient traveling by air may be subjected."

However, he points out that there are several "deviations" which must be considered in each case.

"The first is air sickness, which is clinically identical with carsickness, trainsickness, and seasickness, and thus, is not peculiar to flying."

Gen. Armstrong says oxygen deficiencies and expansion of body gases also are factors for the patient and his physician to consider. He emphasizes the advising physician must determine whether any of these factors would have a detrimental effect on the primary disease.

However, Gen. Armstrong points out that many physicians have been "unnecessarily restrictive in permitting cardiac and respiratory patients to travel by air."

"Identification of those who should fly is relatively simple, if airline flight procedures are understood. In questionable cases, the medical director of the airline concerned is qualified to provide expert opinion and guidance," he says.

Editorials

JOHN F. BRIGGS, M.D.
ARTHUR H. WELLS, M.D.
HENRY G. MOEHRING, M.D.

LISTENING ABILITY AND SUCCESS

There is a belated but very real awakening in American education today to the fact that effective listening means learning economy, increased industrial efficiency, and better professional relationships. *Belated*, because many years have passed since Dr. Paul Rankin's research in which he reported that about 70 per cent of our waking day is devoted to verbal communication, and that 45 per cent of that verbal communication is devoted to listening. *Very real*, because more and more we are recognizing that reading and listening are our two great and basic media of learning, and that the latter as well as the former must be given direct attention in school.

One evidence of current interest is found in higher education. Seven years ago but one college was teaching listening; today, at least twenty-two of our leading colleges and universities provide this type of instruction. Furthermore, they are conducting, in all, about twice that number of related, graduate-level research projects in an attempt to discover how listening ability can be improved. Such studies should soon decrease the disparity between past research in reading and listening comprehension. Seven years ago more than 3000 studies related to the former had been published; only fourteen related to the latter had appeared.

Two volumes just published by the Curriculum Commission of the National Council of Teachers of English reveal the present concern of persons in elementary and secondary education. Considerable space is devoted to basic listening skills. Dr. Dora V. Smith, chairman, seems to point the direction our schools are most likely to travel when she declares: "It (the Commission) believes that mastery of the skills of reading, writing, speaking and listening is basic to the American way of life and cannot be subordinated to any other aspect of the school program."

Perhaps the most dramatic recognition of the importance of ability to listen has been by management personnel in American industry. A somewhat sudden realization a few years ago that there are clear-cut dollar values in having employees who

listen well has resulted in the institution of a number of training programs designed to achieve that end. Among the first firms to take such action have been American Telephone and Telegraph, The Methods Engineering Council, General Motors, The Dow Chemical Company, The Wood Conversion Company, Minnesota Mining and Manufacturing, and many others. The number is steadily increasing. As Frank E. Fischer, Director of the Communications Course of the American Management Association, has put it: "Efficient listening is of such critical importance to industry, that as research and methodology improve I feel that training departments will have to offer courses in this field."

Within a few years, one of the first steps an employer will take when considering a new employee will be that of verifying the latter's listening index. This index will be derived from standard tests of listening comprehension already available and on the market. The next move—an entirely reasonable and desirable one—may well prove to be the use of the listening index as an additional criterion for the screening of candidates for medicine, law, or other types of professional training.

RALPH G. NICHOLS
Professor of Rhetoric
University of Minnesota

STEROIDS AND ARTHRITIS

Hench, Kendall, Slocumb and Polley announced in 1949 the potent effects of ACTH and cortisone on rheumatoid arthritis and related conditions. The vast experience of the past six years with these preparations and subsequently developed derivatives has substantiated and extended the early reports. The steroids are of proved value for systemic use in the treatment of rheumatoid arthritis and arthritis associated with other systemic diseases, such as rheumatic fever, in the treatment of lupus erythematosus and drug sensitivity and occasionally in the symptomatic management of the acute painful shoulder. The steroids are less satisfactory for systemic use in the long-term control of the episodic type of rheumatoid arthritis and palindromic rheumatism because of difficulties in adjusting

dosage. These hormones are not of value for systemic use in osteoarthritis and should not be used in specific infectious arthritis.

Much has been published concerning the metabolic changes seen in short-term therapy with the steroid hormones. These metabolic effects develop more quickly with excessive dosages and occur more readily in women than in men. Postmenopausal women and preadolescent children require a smaller dose than men for therapeutic effect and are especially susceptible to the effects of overdosage. Reversal of these changes is much slower in patients who have taken steroids for more than two months than in those who have taken them for less time.

A systemic reaction occurs in many patients given these steroids in excessive doses for prolonged periods for control of rheumatoid arthritis. This reaction is characterized by emotional instability, fatigability and generalized aching, in addition to one or more of the clinical changes typical of Cushing's syndrome. If such a reaction is not recognized and managed by gradual reduction of dosage in addition to conservative management of the systemic illness, a mesenchymal reaction simulating lupus erythematosus or periarteritis nodosa may develop. Such mesenchymal changes may be mistaken for a flare of the arthritis.

The steroids should be used as an adjunct to the accepted conservative methods of treatment of rheumatoid arthritis, namely, rest, physical therapy and salicylates. Systemic steroid therapy for rheumatoid arthritis is usually most effective when the smallest possible daily dose needed to suppress the systemic disease is administered in divided doses of relatively equal portions every 6 to 8 hours. Caution is necessary to insure that the steroids are not used primarily as analgesics to allow excessive use of damaged joints. Intra-articular injections of steroids may be of benefit in individual selected instances.

The development of analogues of cortisone producing anti-inflammatory effects with somewhat less alteration of electrolytes encourages hope for improved steroid therapy with even more selective effectiveness for certain types of arthritis in the future.

JOHN G. MAYNE, M.D.

SALESMANSHIP

How many new and valuable ideas, inventions, developments and theories have been lost to the world because of lack of skill in properly presenting their merits, thus defeating their acceptance by others and the world at large?

Whether the nature of our work be an avocation or along professional lines, would it be too broad a statement to say that if our efforts are to be successful resulting in accomplishment, there is a requirement on our part of salesmanship in its true sense?

Should we agree—then "What is salesmanship?" Is it the blatant haranguing of the "barker?" Is it the horse-trading instincts of the "Yankee peddler" — the fast-talking, boisterous-living, flashily dressed "drummer," all of whose characteristics in the minds of many frequently continue to be associated with the term salesman?

It is none of these. Under present-day circumstances, their methods would fail to succeed. Because of modern newspaper circulation, circulation of magazines, trade journals, scientific journals, expansion of education, radio, television and increasing ease of travel, communication has expanded far beyond that of the past. Thus, distribution of ideas, services and goods has developed into a higher science in meeting the requirements of our changing world.

Perhaps it is too general in comprehensive definition to say that salesmanship is the skill by which ideas, services and goods are properly presented to others and the world at large. Perhaps it would be better to say it is the measure of "wit" by which we present our offerings to the world.

Wit is one of the most important tools of selling. It would be worthwhile for everyone to review carefully the definition of "wit" in Webster's Unabridged International Dictionary which employs a full column of fine print for the purpose. It will be noted that "wit" should not be confused with its synonym "humor." Humor commonly implies broader human sympathy but does not imply all of the meaning of "wit," since "wit" is more purely intellectual, embodying humor only when required.

In the objective of gaining the acceptance for our ideas, services or goods offered, we must first have a thorough knowledge and background of our subject. It is then that our skill or wit comes

to play so that logically and intelligently we portray and properly present what we desire to offer. Our aim is to influence people to think as we think, to desire as we wish them to desire.

The style of presentation must be altered and suited according to our estimation of the personality or personalities whose attention we wish to obtain. This is necessary, if we are to gain acceptance for our proposal. Thus we must maintain a flexibility in our approach since individual personalities are as different as human nature provides.

For example, a technical man may freely discuss his subject with another technical man in the understandable terms of his profession. Should he similarly discuss the same subject with one who has no technical training, he may sound impressive but would not be understood. To the latter, we must translate our presentation into simple layman language if our point is to be made.

In any walks of life, an expert thoroughly skilled in his subject but who shows intolerance toward any except those whose knowledge is equal to his own will seldom develop many friends. The expert who listens with patient interest to the views of all others before expressing his own ideas makes closer friends, develops their confidence and will have more of his views accepted. It is he to whom most people will wend their way for advice.

Where our objective is to gain an acceptance for what we have to offer, be it ideas, services or goods, we must develop in the mind of the listener the value it has for him and his desire to have it. In so doing, we must with friendly attitude develop a confidence in what we are offering and in ourselves. Thus we must show an honest and sincere interest in our product and an enthusiastic belief in the value we are attempting to share or have accepted by others.

We must show an unselfish and willing interest by backing our offering with our personal service, thus bringing to attention our personal interest to extend the best benefits of our offering. We must honestly give, in order to get.

For centuries the Chinese have gained a reputation for showing great aversion toward change. Is this a characteristic limited alone to the Chinese?

There is evidence of considerable reluctance on the part of all of us to exchange established habits

and ideas for new habits and new ideas. This applies equally to services and developments as well as to brands and types of goods.

Whether we are offering ideas or services or have the avocation of distributing goods, there is a requirement for a high type of salesmanship in all of its ramifications. By our skill or wit, we may properly present the better values, the new concepts of that which we offer if their acceptance is to be obtained.

Regardless of the path of our work or effort, our success and accomplishments depend on this.

JOSEPH C. DUKE

ACTIVITIES OF THE MEDICAL TESTIMONY COMMITTEE

The Medical Testimony Committee of the Minnesota State Medical Association, appointed in 1940 by the President and Council of the Association, has a history of marked accomplishment to its credit.

During the fifteen years of its existence, this committee has investigated the expert medical testimony of thirty-three physicians, about whom a complaint in writing was submitted to the committee. At each investigation, the committee had the assistance and opinion of three specialists in the particular field of medicine involved. In six cases, the testimony was found satisfactory, and the physician was not informed about the investigation. In seventeen cases, the testimony was found somewhat questionable or over-enthusiastic, and the physician under investigation was interviewed by a member of the committee. The committee's decision and the opinion of the specialists were discussed with each physician, and the results in sixteen cases were very satisfactory. In the seventeenth case, however, there was no improvement in the physician's expert testimony, and with the next complaint his case was referred to the Minnesota State Board of Medical Examiners for disciplinary action, as were nine others, in which the testimony was of a very serious nature. In one case, the report was sent direct to the Judge of the Supreme Court who had requested the examination. This testimony was very questionable.

During the early years, several requests for investigation were received from physicians. During the past five years, only one request has been submitted by a physician. All others have come

from members of the Bar Association. In order to avoid any embarrassment, *no one except the chairman* of the committee has any knowledge of the source of a request for an investigation. Assuredly, the committee does not have a pleasant job, but a serious and uncomfortable duty. In order that the committee may function properly, it is of the utmost importance that the members be kept informed about any questionable expert medical testimony. Only by that means can the committee keep expert medical testimony on a high level in the courts of the state.

The work of this committee has received recognition throughout the United States from other State Medical Societies, as well as from legal societies, law schools, and other organizations. In a recent book on "Legal Medicine," an entire chapter is devoted to the activities of our Minnesota Medical Testimony Committee.

E. M. HAMMES, M.D.

Chairman, Medical Testimony Committee

BLUE CROSS AND "TAKE-HOME DRUGS"

Under the Blue Cross contract, the patient pays for "take home drugs."

In the Schedule of Benefits in the Blue Cross contract, Benefit 11 specifies:

"Drugs, biologicals and solutions used in the hospital and listed in the latest edition of the United States Pharmacopoeia, The National Formulary or New and Non-Official Remedies, except blood and blood plasma."

The phrase "used in the hospital" contained in this benefit means just what it says. To be covered by Blue Cross, drugs must be used in the hospital; drugs taken home or used outside the hospital are also outside the scope of Blue Cross coverage.

However, recent audits of hospital records have shown some misunderstanding as to who is responsible for payment for "take home drugs." In certain instances, "take home drugs" had been included in the Blue Cross billing, and Blue Cross had covered allowances on these cases. To rectify some such situations, it has been necessary for Blue Cross to recover substantial sums from the hospitals involved as reimbursement for these "take home drugs" that had been included on the Blue Cross bill and that were not covered by the Blue Cross contract.

To prevent hardship on the hospital, it is most

important that great care be exercised in designating and segregating "take home drugs" from drugs used by the patient in the hospital. If a misunderstanding occurs and Blue Cross is charged for "take home drugs," the hospital is placed in an embarrassing and in a costly position at some future date when such a misunderstanding is discovered, and it is necessary for the hospital to reimburse Blue Cross for the "take home drugs" for which Blue Cross has been billed and has paid. In this situation, the hospital is faced either with the alternative of going back to the patient to collect for these "take home drugs," thus running the risk of poor public relations, or of bearing the expense of such "take home drugs" itself.

Blue Cross is co-operating with the Minnesota Blue Cross hospitals in providing the hospitals with stamps indicating "take home drugs" that the hospitals can use on their records. If care is used is designating and segregating "take home drugs," no "take home drug" problem will arise for either the hospitals or Blue Cross.

ALBERT A. O'LEARY

*Director of Hospital Relations,
Minnesota Blue Cross*

WHO WILL BECOME AN ALCOHOLIC?

There are warning signs for the potential alcoholic person which appear during and after drinking. A person disposed to alcoholism drinks consciously and purposely for the effects of alcohol on his feelings and attitudes. These feelings may be vague and hard to define, such as a dim awareness of being ill at ease.

On the surface he appears to be well adjusted, but it is a borderline adjustment. He may eventually lose complete control over the time and amount he drinks. He is filled with remorse about what he did yesterday, and he is worried sick about what tomorrow will bring.

Sometimes a person may drink to escape worries or troubles. At a party, he may sneak a few "quick ones" to steady his nerves. He may have a fixed time for drinking and feel uncomfortable if he misses it. He may find himself thinking more of the drinking than the sociability which goes with it. He may start to lie about his drinking. He may have long periods of sleepless-

This is the second in a series of four editorials on the subject of alcoholism.

ness. He may become unjustifiably suspicious or jealous. He may slip himself a drink in the morning. He may start to "get tight" oftener. Then, eventually, he may go on a spree after which, ashamed, he resolves not to drink again. Sooner or later, though, his "nerves" get the better of him, and he takes another drink. This starts another spree. *He may "pull a blank" or "black out."* He may have vague, nameless, constant fears. *These are the storm warnings.*

PAUL S. RAHNEFF
Citizens Commission on
Alcoholism, Inc.

DOCTORS—NOT TIME—SHOULD MAKE THE DIAGNOSIS OF CANCER

We have an instinctive belief that many physicians will not receive with enthusiasm the 1956 campaign slogan of the American Cancer Society which emphasizes periodic medical checkups and is designed to increase the number of examinations of presumably "well" people.

There can be no direct criticism of the American Cancer Society for favoring periodic examinations of apparently well people. Its position is strongly arched and buttressed by the overwhelming support of the clear-thinking leaders of the medical profession, the force of public opinion, and sound statistical arguments.

Medical objections to the program will be expressed by negativism and arguments which circumvent the facts, and will come from physicians who have not adjusted their practices to include a place for the patient who wants a periodic checkup.

It is understandable that physicians are not generally enthusiastic about periodic examinations of apparently well people. Frankly, we have been thoroughly bored by a deluge of routine examinations: army, insurance, industrial and "what-have-you." We accept, in principle, the value of such examinations but we tend to consider them as necessary evils which mar the pleasures to be derived from practicing a profession. Our enthusiasm is kindled chiefly by the challenge of such matters as a difficult diagnostic problem, or the cure of a seriously ill patient by the skillful use of our knowledge and skills.

While meeting the challenge of skillful diagnosis

and therapy, perhaps too many of us are overlooking an equally challenging field of medicine. Up until now, we have been content to settle for a diagnosis of symptomatic cancer, after the differential exclusion of other diseases which cancer so slyly mimics. Actually, though, *time* has made the diagnosis for us: the patient with a symptomatic cancer has had the disease for as long as several months to several years before we see the obvious! The real challenge of the future is the skillful diagnosis of the asymptomatic cancer in the "well" person.

We suggest that a thing seriously pursued affords true enjoyment. That portion of a busy medical practice which is devoted to the searching examination of an apparently well patient who wants to know "Do I have cancer?" is truly enjoyable if seriously pursued.

The dividends are many and rewarding: the gratitude of a patient who can get a satisfactory answer to a vexing question from his personal physician—a patient who will come back again; the frequent detection of latent disease unrelated to cancer, and, though the yield is small, an occasional diagnosis of curable cancer before *time* has made it obvious. Doctors—not *time*—should diagnose cancer.

DAVID P. ANDERSON, M.D.
Chairman, Cancer Com-
mittee, MSMA

RADIATION PROTECTION FOR THE TECHNICIAN IN TRAINING

Emphasis, at the present time, on radiation protection of the entire population seems to make necessary re-evaluation of procedures which in the past were considered acceptable. The concept of tolerance dose of radiation is now redefined (National Bureau of Standards Handbook 59) as a "tolerable" dose. This is intended to convey the concept that all radiation is damaging and that there is no such thing as a dose which will produce no damage. The "tolerable" dose is that which can be accepted without any *detectable* damage within the life span of the individual.

On the basis of this concept, it is the responsibility of all individuals, schools, and hospitals who utilize and teach x-ray procedures to eliminate, wherever possible, unnecessary exposure

to x-radiation. No longer can one justify utilizing students as "patients" in teaching x-ray technique. No radiographic procedure using a student as patient can be considered acceptable unless the end results of the procedure are medically useful for the individual patient (as, for example, the routine chest film required on admission to the school).

On the basis that the school can no longer justify what might rightly be termed "spending part of the tolerable lifetime radiation dose" for the student, how can a school not connected directly with a hospital or supply of patients teach x-ray technique properly without using students as patients?

There are readily available substitute materials which can be used to teach x-ray physics, radiographic exposure techniques, etc. Untempered masonite suitably replaces water equivalent tissue (as the abdomen). Plywood has a density equivalent to the thorax. Use of these materials will reduce considerably the necessity for using patients during the early part of the technician's training. Anatomy, radiographic anatomy and positioning for radiography can be taught without energizing the x-ray machine. The final stage of training, in which the procedure on the patient is necessary, will then not be possible in the school, unless arrangements can be made with a clinic or a hospital.

On the basis of recent interpretations of tolerance dose of radiation, it is the opinion of the writer that the time has come to consider unnecessary exposure to the technician in training as a removable hazard and to move to condemn such practices *in toto*.

JAMES F. MARVIN, PH.D.
Radiological Physicist

WHAT CONSTITUTES THE PRACTICE OF MEDICINE?

An official answer to a problem harassing both physicians and hospital Boards of Directors over the country was sounded for the third time in more than a decade before the House of Delegates of the American Medical Association at the Boston Clinical meeting last November. The report of the committee on Medical Education

and Hospitals which was approved by the delegates follows:

WHEREAS, The American system of private practice of medicine has given us the highest health and medical standards in the world; and

WHEREAS, The American Medical Association has publicly declared its stand in favor of this system of private practice; and

WHEREAS, The practice of pathology, including both clinical and anatomic pathology, is the practice of medicine; and

WHEREAS, In many states the attorneys general have written opinions stating that the operation of laboratories and departments of radiology and anesthesia by corporations, including hospitals, is illegal, and that the acceptance of employment from such corporations by a licensed practitioner of medicine under terms permitting the corporation to charge a fee for his services is unethical fee splitting and illegal; and

WHEREAS, As a result of such interpretations attempts are being made by certain lay groups to amend the laws, or their interpretations, to permit the division of pathology into professional and technical services, the latter to be the work of the pathologist's technical assistants who perform under his direction and supervision and not to be considered the practice of medicine and, therefore, services which may be legally performed by a hospital; and,

WHEREAS, If this position should be sustained, fragmentation of the practice of pathology would be accomplished and thus all medicine would be in danger of being so divided to the detriment of the patient; and

WHEREAS, As early as 1943 the American Medical Association studied this problem and stated that the "House of Delegates of the American Medical Association is opposed to the division of any branch of medical practice into so-called technical and professional factions," and later, in 1951, that "the practice of anesthesiology, pathology, physical medicine, and radiology are an integral part of the practice of medicine in the same category as the practice of surgery, internal medicine, or any other designated field of medicine"; therefore be it

RESOLVED, That the House of Delegates of the American Medical Association is opposed to the division of any branch of medical practice into so-called technical and professional services; and be it further

RESOLVED, That because of the confusion existing in some states in regard to this question this House of Delegates reaffirm the position taken in 1943 and 1951.

President's Letter

MINNESOTA AND THE AMERICAN MEDICAL EDUCATION FOUNDATION

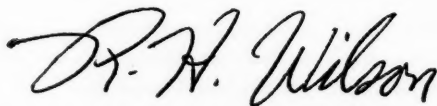
The National Fund for Medical Education was founded in 1951 for the purpose of securing voluntary contributions from industry, medical associations and individual physicians to help meet the rising cost of medical education. It was estimated that \$10,000,000 annually in additional funds were needed by our eighty-one medical schools, if they were to maintain their high standards of teaching and research. The American Medical Association undertook to raise \$2,000,000 of this amount annually from the physicians of the nation, on a voluntary contribution basis. The AMA generously contributed \$500,000 annually for the years 1951-54, inclusive, then in 1955, reduced their contribution to \$100,000, believing, that as the individual physicians became aware of the need, they would make up the difference. The AMA, in 1951, set up the American Medical Education Foundation as an agency to solicit and collect the physician's share of the voluntary contributions, and agreed to pay all operational costs of the agency so that every dollar contributed would be turned over to the National Education Fund to be distributed to the Medical Schools.

Minnesota, as did most of the other states, got off to a slow start. From 1952 to May, 1955, Minnesota doctors had contributed only \$27,000. Minnesota's share of the needed \$2,000,000 would be about \$40,000 annually.

In 1954, 138 Minnesota doctors contributed \$5,890.38. In 1955, 588 doctors contributed \$17,147. In May, 1955, our House of Delegates voted to support the plan of Dr. H. E. Drill, State Chairman, to solicit on the County Society level with a chairman in each county society and a councilor district chairman to co-ordinate their activities. In September, 1955, Dr. Drill called a meeting of all the county chairmen and councilor chairmen at St. Paul for purposes of information and organization of a definite campaign period.

I am glad to report to you that as a result of this effort, Minnesota doctors are doing much better. In January, 1956, 248 contributors gave \$7,590 and 142 contributors gave \$2,996.75 in February, 1956, or a total of \$10,733.75 in two months. But that accounts for only 390 contributors out of our membership of approximately 3,000, roughly 12 per cent. What has our Medical School received in return from the National Fund? In 1954, the University of Minnesota Medical School received \$35,762.75, and total grants to January 1, 1955, have been \$102,718.75. The 1955 figures are not yet available.

The week of April 23-29, 1956, has been designated as National Medical Education week, of which you will hear much more in the immediate future. I trust you will all participate in the week's activities in your respective communities and will become inspired to join the increasing numbers contributing to the American Medical Education Foundation in our state.



President, Minnesota State Medical Association

Medical Economics

Edited by the
Committee on Medical Economics,
Minnesota State Medical Association
George Earl, M.D., Chairman

COUNTY SOCIETY OFFICERS MEETING

The County Society Officers meeting in Saint Paul on February 25 dealt with three aspects of the current medical scene of interest to Minnesota doctors. They were "Medical Care for the Indigent," "Insurance Plans for Members" and "National Legislation and the Medical Viewpoint."

Medical Care for the Indigent

Dr. C. L. Oppegaard, chairman of the Council, described the history and development of medical care for welfare patients in this state. He spoke of the improvement of medical care from the old county physician days to the present day program where all relief clients have the free choice of doctor; it is this approach for which the state association has fought, though it was not adopted until the special session of 1937.

Those people who are receiving aid today are getting excellent care and all concerned can take justifiable pride in solid progress. However, it is difficult to keep rising costs under control while carrying on a program of good medical service. Dr. Oppegaard said:

"Remember, the alternative to willing and zealous co-operation on the part of the doctors of the state may well be new bills to cut costs; bills that will not only cut costs, but cut medical service to the point where the good work of years will be undone. So costs *must* be cut. At the same time standards of service *must* be maintained. Those are the two horns of our dilemma. We must ride them both, if we are not to sacrifice the progress achieved over many years in our system of medical care for the needy sick."

Mr. Morris Hursh, Director, Department of Public Welfare, praised the close and pleasant contact his office has had with medical groups in Minnesota: the Council and members of the Minnesota State Medical Association; Dr. R. H. Wilson and the members of the State-Wide Medical Advisory Committee.

The rising cost of medical care to welfare patients has been of great concern to the Department of Public Welfare and the Legislature. In 1955 the Legislature decided that (1) no type of medi-

cal care should be paid for by the county unless it had been authorized by the County Welfare Board and (2) maximum fees should be established for every kind of care, including drugs as well as medical procedures.

Mr. Hursh felt that prior authorization was sound business practice, but that the setting of fees was already being done by the State-Wide Advisory Board. However, on April 1 the new maximum fee schedule, the same schedule used by Blue Shield Plan A for medical and surgical care, and by Blue Cross for hospital charges, will go into effect.

Though doctors' fees account for only 12 per cent of the total welfare bill, doctors hold the key to the success of the program, because it is their responsibility to authorize hospital and nursing home care. Fee schedules for individual counties will be worked out separately and it is important to remember that the schedule is a maximum.

Prior authorization is sometimes difficult to handle, especially when it is necessary for a patient to remain in the hospital for thirty days or longer. One benefit that results from this requirement, however, is that hospital stays are being shortened, which might be a big factor in bringing down welfare costs.

Regarding the general principle of welfare care, Mr. Hursh emphasized that no one wants to give less adequate care to welfare patients. Also, that rising costs should not be a surprise: as the lengthened life span increases the proportion and numbers of elderly persons, the situation will get worse, and cutting welfare services is not realistic.

President R. H. Wilson, until recently chairman of the State-Wide Advisory Committee of the Division of Public Welfare, said that inflation and the growing geriatric problem accounted largely for the rising costs of medical care to the state. The mean age of recipients is seventy-seven years in Minnesota.

According to Dr. Wilson, prior authorization for medical care creates a problem of much additional time and labor on paper work. And, not being doctors, county boards cannot conscientiously refuse medical care that a physician has requested.

MEDICAL ECONOMICS

The decision reverts to the medical advisory committee, whose members judge the necessity for the care and eliminate unnecessary care.

Prior authorization for hospitalization is a different matter. It works well in limiting the length of time patients stay in the hospital and reduces hospitalization costs. A further reduction will show up when nursing home care has been limited.

Dr. Wilson commended the co-operation of the Department of Public Welfare and said that though a state-wide uniform fee schedule was considered more desirable, most doctors are not dissatisfied with the new maximum schedules where each county welfare board and county medical advisory committee negotiates individual county rates. The State-Wide Medical Advisory Committee approves county schedules, but does not enter into the negotiations, he emphasized.

GROUP LIFE INSURANCE

Mr. A. R. Hustad, Northwestern National Life Insurance Company, explained the program available to Active and Resident members. Members who are sixty-five or younger are eligible for \$5,000 insurance and members who are sixty-six to seventy-five are eligible for \$2,500 insurance under certain conditions. Premium rates are very low; for example, the annual premium for \$5,000 insurance for a man of thirty-five is \$34.50.

Members of component societies where the plan has been accepted can take out the insurance at any time, if they are insurable. Also, any member of one of these societies can take out insurance until May 1 without a physical examination, provided a total of 100 members from qualified societies enroll.

New societies can participate in the plan this year without a physical examination being required of applicants, provided seventy-five per cent of the active members enroll.

A complete discussion of malpractice insurance will appear soon in MINNESOTA MEDICINE.

NATIONAL LEGISLATION

Mr. C. Joseph Stetler, Director, Law Department, AMA, described AMA activities with regard to national legislation. Of the 12,000 bills introduced at the first session of the 84th Congress, 400 of them had some connection with medicine.

Seventeen people employed in the Washington

office of the AMA spend most of their time answering inquiries from Senators and Representatives. Other duties include arranging for medical witnesses on proposed legislation, preparing testimony, and studying bills.

The cornerstone of the health proposals of the Administration is a program for medical research and one-time grants to medical institutions. Since opposition had been to maintenance support that would eventually give the government a voice in management and policies, this program is not considered objectionable.

Discussion of shortages in the medical field is no longer concentrated on doctors: nurses and certain specialties are listed as being short of qualified personnel.

Greater emphasis has been placed on removing the obstacles in the way of private companies handling poor health insurance risks. Reinsurance as a government issue seems to be dead.

It has been proposed that the Hill-Burton Act be extended for two years after 1957 when it was to expire. The AMA feels that the time has come for an appraisal of what has been accomplished with this act; to see if it has fulfilled its purpose and to judge whether it is the best answer to the problems in the field of hospital construction aid.

The Defense Department has a bill that would offer greater incentives to induce more doctors to make a career of the service. This is being supported, though it does not go far enough to be fully effective. Some bill dealing with doctors in service will be passed and it is to be hoped that it will be more effective than the present one.

Congress is now considering a bill that would authorize commissions for osteopaths in the armed forces. If this bill should become law, it would mean that osteopaths would share the same responsibilities that M.D.'s have as medical officers; servicemen would not know what training the doctor treating him had received. This, of course, would wreck any plan for an incentive program for M.D.'s.

Several approaches to the question of medical care for military dependents have been suggested. The AMA takes the position that care for military dependents at military facilities and by military personnel should be restricted to overseas establishments.

Mr. Stetler underlined the fact that though

MEDICAL ECONOMICS

the AMA can evaluate legislation and alert the profession to bills inimical to the welfare of medicine and the country as a whole, their main function is to provide information for Congress and other departments of the government.

SEARS FOUNDATION CONTINUES PRACTICE GRANTS

The Sears-Roebuck Foundation has announced that it has allotted \$125,000 to continue its program of long-term, unsecured loans to physicians to help them set up practice units. Greater emphasis will be placed on locating doctors in communities without medical care.

Last year the Foundation assisted in establishing ten units, some to retain existing facilities in areas about to lose them. Loans range from \$3,000 to \$25,000 to applicants screened and selected by a seventeen-man advisory board of physicians named by the trustees of the AMA. Dr. J. A. Bargen, Mayo Clinic, is the member from this region. This year a minimum of \$149,000 will be available for the program.

Mr. Theodore V. Houser, president of the Foundation, has said:

"Some of the criteria for evaluating requests for assistance will be the professional qualifications of the applicant, the availability of medical service in the community, the extent of community participation in establishing the proposed unit, and the soundness of the plans proposed for providing medical care."

He emphasized that loans will not be made for the purpose of refinancing current obligations.

Grants are repayable any time within ten years, with payments being made in equal monthly installments starting not later than the beginning of the fourth year. Until repayment is begun, interest is charged at the rate of 6 per cent per year, payable monthly. No interest is charged after repayment begins. After the fifth year when interest payments have ceased, recipients make monthly contributions to a revolving fund. This is in recognition of the aid they have received and to assist other physicians.

All interest money and pledge money, along with all repaid loans, is used for the purpose of establishing additional medical practice units. The addition of these funds to the basic amounts provided by the Foundation will enable the plan to grow, Mr. Houser said.

THE MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

230 Lowry Medical Arts Building
Saint Paul 2, Minnesota

F. H. Magney, M.D., Secretary

MINNEAPOLIS MAN SENTENCED FOR VIOLATION OF BASIC SCIENCE LAW

Re: State of Minnesota vs. Lafayette M. Gray

On February 18, 1956, Lafayette M. Gray, eighty-one, 5025 Queen Avenue South, Minneapolis, was sentenced by the Hon. John A. Weeks, Judge of District Court of Hennepin County, to a term of 30 days in the Minneapolis Workhouse following Gray's plea of guilty to practicing healing without having a basic science certificate. However, Judge Weeks suspended the sentence on condition that the defendant refrains in the future from selling Powdr-X and that he surrenders his supply of Powdr-X to the authorities.

A complaint had been issued on February 9, 1956, charging Gray with the above offense after he had examined a Minneapolis woman and recommended his product Powdr-X for her condition, making a charge of \$3.00 for a can of the powder. Gray told the woman that Powdr-X would "pep up her appetite" if taken internally, and for her eye condition he recommended that she put a teaspoonful of it into a glass of warm water and after letting it settle, use the liquid in an eyecup three or four times per day.

The defendant has a previous conviction in United States District Court in Minneapolis on March 22, 1950, when he was sentenced by Judge Gunnar H. Nordbye to pay a fine of \$1,000.00 following Gray's entering a plea of "nolo contendere" to two counts in an information charging him with violating the Federal Food, Drug and Cosmetic Act. Gray had been convicted by a jury in the same Court on March 27, 1948, of introducing in interstate commerce at Minneapolis, a number of packages containing a drug called Powdr-X, and it was charged that a letter accompanying the shipment contained the following statement: "In fact it is an ointment that is splendid for almost any infection, abrasions, or ulcers." It was further alleged that the drug was misbranded in that the above statement was false and misleading because the drug is not efficacious in the cure, mitigation and treatment of infections, abrasions or ulcers. Following his conviction by the jury, Gray appealed to the United States Circuit Court of Appeals, which Court reversed the conviction because of errors in the form of verdict used and remanded the case for a new trial.

MAN IMPERSONATING PHYSICIAN SENTENCED TO FIFTEEN-YEAR PRISON TERM FOR GRAND LARCENY

Re: State of Minnesota vs. Raymond Thayer Lawton

On February 8, 1956, Raymond Thayer Lawton, forty-six, formerly of White Bear Lake, Minnesota, was sentenced to a term of fifteen years in the State Prison at Stillwater, Minnesota, by the Hon. Axel B. Anderson, Judge of the District Court, at Faribault, Minnesota. Lawton had been tried and found guilty by a Rice County jury on January 25, 1955, of grand larceny in the second degree. However, the defendant was not sentenced at that time because he entered a plea of not guilty when arraigned on an information charging him with four prior convictions for felonies. While Lawton was awaiting trial on this charge, he escaped from the

(Continued on Page 262)

The Dean's Page

LABORATORY MEDICINE

The day seems to be passing in which the physician performs much of his own laboratory work. Important as it may be to the diagnosis and management of disease, he will expect others to perform this role. He will come to rely increasingly on the skill of these other hands. This becomes clear when one considers the large contributions that chemistry, bacteriology, hematology, and other laboratory sciences are making to the advance of American medicine in this century.

A physician is by nature a skeptical person. A report from the laboratory may be to him just a slip of paper of questionable value. Still he must come to trust the skills of laboratory workers in order that these skills may help him make the decisions he must make. For this reason, if for no other, each physician and all physicians must be vitally concerned with the establishment of high standards of laboratory training and practice.

There are now many workers poorly trained; there are many schools that exploit heartlessly the needs for workers in this field. Glowing advertisements promise a short pleasure course, immediate vocational success. At the same time, approved schools of medical technology suffer progressive decrements in enrollment. Perhaps this field needs a sober study such as the one which culminated in the Flexner report on medical education in the early part of this century. After that report, organized medicine developed and enforced high standards of medical education, closing the "diploma mills." Today, medical technology, an emerging profession under the aegis of organized medicine, needs its strenuous support and encouragement. Under the best of circumstances, it will gradually fill the need for professional clinical laboratory workers.

In a further attempt to alleviate the shortage of adequately trained personnel, a course for laboratory workers at a sub-professional level was established at the University of Minnesota two years ago. This was established and developed with the cooperation and aid of the Minnesota State Medical Association, the Minnesota Hospital Association, the Minnesota Societies of Clinical Pathology and Medical Technology, and the Minnesota Department of Health. It is a one-year course with six months of formal training at the University and six months of internship in an approved hospital laboratory. The graduates of this course, called Laboratory Aides, will help to provide the need for workers especially in hospitals in smaller communities and in doctors' offices.

Modern medicine requires a larger laboratory participation in patient management than ever before. The physician is not physically able to perform all these laboratory functions himself. To meet this challenge, medical technology arose as an ancillary profession and with the support of organized medicine and of each individual physician will continue to play a steadily more effective role. There are needs for well-trained workers at a lower level such as laboratory aides. Finally, physicians themselves specializing in this field of endeavor will give it new orientation, force, and effectiveness.

—HAROLD S. DIEHL, *Dean*
University of Minnesota Medical School

Minnesota State Medical Association

103rd Annual Meeting

Rochester, Minnesota—May 21-23, 1956

Preliminary Program

BUSINESS SESSIONS

Kahler Hotel

SATURDAY, MAY 19

2:00 P.M.—Council.....University Club, East Room
6:00 P.M.—Council.....University Club, East Room

SUNDAY, MAY 20

8:30 A.M.—Council.....University Club, East Room
10:00 A.M.—Reference Committees.....Mezzanine Floor
2:00 P.M.—House of Delegates.....Royal Coach Room
6:00 P.M.—Council.....University Club, East Room
8:00 P.M.—House of Delegates.....Royal Coach Room

MONDAY, MAY 21

8:30 A.M.—Council.....University Club, East Room
12:15 P.M.—House of Delegates.....Royal Coach Room
12:15 P.M.—Committee on Medical Testimony
Room to be assigned

TUESDAY, MAY 22

8:30 A.M.—Council.....University Club, East Room
8:30 A.M.—Committee Breakfasts
Rooms to be assigned

WEDNESDAY, MAY 23

8:30 A.M.—Council.....University Club, East Room
8:30 A.M.—Committee Breakfasts
Rooms to be assigned

SOCIAL EVENTS

SUNDAY, MAY 20

5:30 P.M.—Fellowship Hour for Officers, Councilors,
Delegates—Mezzanine Floor, Kahler Hotel.
6:00 P.M.—Smorgasbord, open to all. Rochester
Country Club.

MONDAY, MAY 21

Luncheons

12:00 noon—American Medical Women's Association,
Minnesota Branch. Town House.
12:15 P.M.—Minnesota Society of Clinical Pathologists.
Town House.
5:00 P.M.—Fellowship Hour. Cloud Room, Kahler
Hotel.

Dinners

6:15 P.M.—Minnesota Academy of General Practice.
Elizabethan Room, Kahler Hotel.
6:30 P.M.—Minnesota Society of Clinical Pathologists.
Annual dinner and business meeting.
Regency Room, Kahler Hotel.
7:00 P.M.—Minnesota Radiological Society. Cen-
tennial Room, Kahler Hotel.

Open House

9:00 P.M.—Minnesota State Medical Association.
Mayo Civic Auditorium.

TUESDAY, MAY 22

5:45 P.M.—President's Reception. Cloud Room,
Kahler Hotel.

Dinner

7:00 P.M.—Minnesota State Medical Association,
Annual Banquet, Elizabethan Room,
Kahler Hotel.

ROUND TABLES

Kahler Hotel—12:15 P.M.

MONDAY, MAY 21

Disturbed Clotting Mechanism in Obstetrics
JOHN A. HAUGEN, Minneapolis
CHARLES A. OWEN, Rochester
Office GynecologyM. B. SINYKIN, Minneapolis
Management of Head Injuries
WINGHELL MCK. CRAIG, Rochester
Palliative Treatment for Metastatic Carcinoma
of the BreastWILLIAM M. MCCONAHEY, Rochester
DAVID G. DECKER, Rochester
Fluid and Electrolyte Balance
EDMUND B. FLINK, Minneapolis
Management of HypertensionJAMES J. COLL, Duluth

TUESDAY, MAY 22

Recent Trends in Antibiotic Therapy
DONALD R. NICHOLS, Rochester
Diagnosis and Management of Rheumatic Fever
PAUL F. DWAN, Minneapolis
Diarrheas in Infants and Children
CHARLES W. ROGERS, Winona
Treatment of OverweightWILLIAM B. MARTIN, Duluth
Controversial Issues in Myocardial Infarction and
Cardiac EmergenciesH. B. BURCHELL, Rochester
DiabetesMOSES BARRON, Minneapolis
Alterations in the Blood Levels During Gestation
W. J. MCGANITY, Assistant Professor of
Obstetrics and Gynecology, Vanderbilt
University School of Medicine, Nashville,
Tennessee

WEDNESDAY, MAY 23

Peripheral Vascular Diseases (Excluding
Hypertension)DAVID M. CRAIG, St. Paul
Convulsive Disorders in Children
V. R. ZARLING, Minneapolis

PRELIMINARY PROGRAM

GENERAL SESSION

Mayo Civic Auditorium

WEDNESDAY, MAY 23

Morning Session

- A.M.
8:30 Visit Scientific and Technical Exhibits
Auditorium
9:00 Closed Circuit Color Television.....Auditorium
Abnormal Uterine Bleeding

Intermission

- 10:15 Visit Scientific and Technical Exhibits ,
Auditorium
11:00 "The Importance of the Diagnosis of Glaucoma"
P. J. LEINFELDER, Professor of Ophthalmology,
College of Medicine, State University of Iowa,
Iowa City, Iowa
11:30 "Industrial Noise, Every Physician's Problem"
K. M. SIMONTON, Rochester
P.M.
12:15 Round Table Luncheons

Afternoon Session

- 1:30 Visit Scientific and Technical Exhibits
Auditorium
2:00 Closed Circuit Color Television.....Auditorium
Management of Common Skin Diseases
3:15 Medical Quiz
FRANK KRUSEN, Rochester, Moderator

SPECIAL SESSIONS

MONDAY, MAY 21

Morning Session

- A.M.
9:00 Minnesota Society of Clinical Pathologists—
Annual Tumor Clinic
Judd Hall, Mayo Clinic, New Building
Moderator: ARTHUR P. STOUT, M.D., New
York City

11:30 ARTHUR H. SANFORD LECTURESHIP IN
PATHOLOGY
"Metabolic Relationship of Potassium, Nitrogen
and Sodium."

PAUL R. CANNON, Professor of Pathology and
Chairman, Department of Pathology, Univer-
sity of Chicago, Chicago, Illinois

P.M.

12:15 LuncheonTown House

Afternoon Session

- 2:00 Tumor Clinic (continued)
Judd Hall, Mayo Clinic, New Building
6:00 Annual Dinner and Business Meeting
Regency Room, Kahler Hotel

WEDNESDAY, MAY 23

P.M.

2:00 Minnesota Academy of Ophthalmology and
Otolaryngology.....Mayo Foundation House

"Criteria for Cataract Extraction"

P. J. LEINFELDER, Associate Professor of
Ophthalmology, College of Medicine, State
University of Iowa, Iowa City, Iowa

"Divergence Insufficiency"

T. G. MARTENS, Rochester

"Retinal Artery Pressures in the Diagnosis of
Intracranial Vascular Disease"

R. W. HOLLENHORST, Rochester

"Otitic Hydrocephalus"

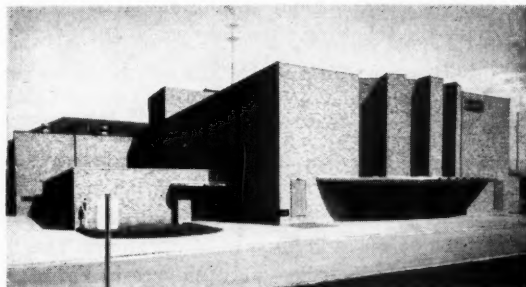
J. B. McBEAN, Rochester

"Carcinoma of the Nose and Sinuses"

K. D. DEVINE, Rochester

"Sudden Deafness of Obscure Origin"

O. E. HALLBERG, Rochester



MAYO CIVIC AUDITORIUM

History of Medicine in Minnesota

THE MEDICAL HISTORY OF RICE COUNTY (1855-1901)

ADOLPH M. HANSON, M.D.
Faribault, Minnesota

(Continued from January issue)

Faulkner, Lloyd Anson.—Was born in Faribault, September 30, 1862; attended public school there, then went to Shattuck. He studied medicine in Chicago and graduated from Bennett Eclectic Medical College in 1885. He was licensed in Minnesota in the same year (June 6) and started to practice in St. Paul. In 1895 he practiced in Duluth and from about 1898 to 1905 in Good Thunder. In 1909, or before, he located in Lonsdale. About 1914 he returned to St. Paul. Dr. Faulkner was an active Mason, reaching the 32nd degree. He was an ardent collector of curios, especially Indian relics and geological specimens.

He died December 18, 1933, in St. Paul, survived by his widow, Anna, and five children: Lloyd, who became head of the *St. Paul Dispatch* art department; J. F. Faulkner; Mrs. Ernest Ritter of St. Paul; Mrs. F. Armstrong of Minneapolis and Lester Faulkner of Chicago.

Gadbois, Wilfred.—He graduated from the Medical School of the University of Victoria, Canada, in 1887. He was granted his Minnesota medical license on May 11, 1887, and first established his practice in Faribault where he stayed through 1898. He died on January 18, 1912, in Montreal.

Gibson, W. C. (Wm. C.).—Was listed in Faribault in 1890. He was licensed in Minnesota "by examination" December 10, 1886. It is not known exactly when he came to Faribault. In 1895 and 1898 he is listed in Morristown and from 1903 through 1909 in Seattle, Washington. He died on June 8, 1915, at his home in Port Angeles, Washington, at the age of fifty-two.

Goudy.—A Dr. Goudy opened an office in Dundas on August 2, 1876. A local weekly of that date made the following announcement:

"Dr. Goudy from Illinois has hung out a shingle at R. C. Snyder's where he is prepared to deal out physic to suffering humanity. Dundas is pretty well supplied with M.D.'s at present, there being three practicing physicians here just now."

He was not licensed and nothing more is known about him.

Goulet, John B. A. (also John and J. A. B.).—Graduated from Victoria College, Montreal, Canada in 1883. He was licensed in Minnesota on March 21, 1885, and in the same year he established his office and residence in Faribault at Third and Elm Streets. He stayed in Faribault only a short time and apparently died before 1890.

Greaves, William.—Practiced in Northfield from 1890 apparently until his death there on June 23, 1907. Dr. Greaves was born in Ontario November 17, 1842,

HISTORY OF MEDICINE IN MINNESOTA

and moved with his parents to Cannon Falls, Minnesota, in 1856. He graduated from the Medical School of the University of Michigan in 1870 or 1871 and was licensed in Minnesota on October 11, 1883.

Hitchcock, Harvey A.—He settled in Springfield, Brown County, Minnesota, in 1878. Born in Courtland County, New York, he studied medicine with a preceptor in Janesville, Wisconsin, and attended a Medical Institute in Cincinnati, Ohio. He removed from Janesville, Wisconsin, to establish a practice at Morristown, Minnesota, and departed Morristown for California in 1881.

Hubbard, E. E.—A graduate of the Minneapolis College of Physicians and Surgeons, he practiced [presumably in Minneapolis] immediately following his graduation in 1894 until 1896, when he went to Faribault where he practiced for two years before moving to Kansas City. There he eventually became the professor of pathology at the Medical Clinic College.

Hunt, William Augustus.—Practiced in Northfield from at least 1890 through 1909. He apparently was born in Northfield in 1858; graduated from the University of Michigan Medical School in 1882 and was licensed in Minnesota December 31, 1883. He was a member of the Minnesota State Medical Association and at one time its third vice president. Dr. Hunt, a gentleman of the "old school," was highly respected and loved in Northfield. He died on January 27, 1921 at Northfield.

Hutchinson, Henry.—A homeopath, practiced in Northfield for four years, 1874 to 1878. He was born in Montreal, Canada, August 20, 1849, and came to Northfield with his parents in 1858. It is said that he started his medical studies under the preceptorship of Dr. A. P. Skeels of Northfield and then went to the Hahnemann Medical College, Philadelphia, from which he graduated in 1874; he started to practice in Northfield in the same year. His Minnesota license he received January 17, 1884. After four years in Northfield Dr. Hutchinson moved to St. Paul in 1878 where in the early 90's he was on the homeopathic board of physicians and surgeons of St. Luke's Hospital. In 1884 he was president of the Minnesota State Homeopathic Institute. From 1901 to 1910 he was president of the State Board of Health and he held a professorship in the Minnesota Homeopathic Medical College. He died in Algiers, Africa, on December 1, 1910.

Huxley, Fredrick R.—A graduate of the Medical School of the University of Minnesota, and now in his eighty-first year and still in active practice here in Faribault where he started his practice in the year 1901, is now the grand old man of our medical profession in Rice County, Minnesota. What Nathan Marvin Bemis was to our profession in his day, Fred Huxley is to it now in our more modern day. A conscientious and highly ethical practitioner all his life and with diagnostic abilities far above the average, even to this date (December 8, 1954), particularly in relation to a correct interpretation of skiagraphs, he is highly respected by all who have the privilege of knowing him. A widower for years and with his two sons middle-aged, he still is active in his office and hospital practice.

He started his practice in Faribault after completing his residency at the Minnesota State School for the Feeble-Minded and Epileptics, and has practiced in Faribault for 54 years.

Jackson, Roscoe Neely.—Settled in Faribault in 1883. He was born in Boonville, N. Y., July 7, 1856. He graduated from the Hungerford Collegiate Institute in 1877 and from the Long Island College and Hospital in 1880.

HISTORY OF MEDICINE IN MINNESOTA

At a conference called by Dr. H. M. Bracken, secretary of the Minnesota Board of Health, in the office of Dr. Daniel M. Cool during an epidemic of small pox in Faribault, which Dr. Jackson had stubbornly persisted in diagnosing as "Cuban itch," and not small pox at all, Dr. Bracken listened to the arguments, pro and con, for several hours. Getting weary of the long drawn-out discussion and wanting to retire for the night, he suddenly interrupted it by saying:

"Gentlemen! You will *diagnose* this as *small pox*. You will *treat* it as *small pox*. You will *quarantine* it as *small pox*. Or *I* will quarantine your town."

(Told the writer by F. R. Huxley, M.D., of Faribault).

Dr. Jackson established a big practice in Faribault. He had one of the first automobiles—an open single-seat White Steamer with the boiler under the seat, which made the seat too hot for comfort. So Jackson had a stovepipe attached to the compartment under the seat that rose perpendicularly back of it above his head. This outlandish engine scared all the horses in the town and in the country all-around. Everybody knew who Dr. Jackson was. He moved to California when about ready to retire. There he was drowned with a sister-in-law when his automobile went off a bridge into deep water.

Jonson, Norton.—Apparently practiced in Canon City around 1870. Dr. Adelia E. Hutchkiss (Sanderson) a pioneer practitioner in Osakis (Todd and Douglas Counties), supposedly started her medical education in his office.

Juell, N.—This medical doctor came to Red Wing, Goodhue County, in 1893, following postgraduate study in Germany. He had previously practiced in Wisconsin and in Minnesota. He was a member of the Goodhue County Pension Board. In 1897 he moved to Faribault where he practiced medicine and ran a drug store.‡

Kelley, Lewis Halsey.—Physician and journalist, was born in Ovid, Seneca County, New York, on October 3, 1808. He graduated from Geneva Medical College in 1838 and Albany Medical College in 1840. Dr. Kelley came to Minnesota in 1858. He was a respected physician and surgeon at Rochester, Minnesota, from 1857 to 1863. He was also a newspaperman from 1860 up to the time of his death in August, 1872 in Owatonna. He bought the *Rochester City News* in 1860 and changed its name to the *Rochester Republican*, becoming its local editor in 1861 and selling it in 1863. He then moved his printer's equipment to Owatonna where he established that town's first newspaper, the *Plain Dealer*. In 1868 he moved to Northfield and took on the *Northfield Recorder* and, a little later, the *Northfield Enterprise*. In 1870 he moved to Faribault to become the publisher of the *Faribault Leader*. Following his death two years later, a son carried on in his father's place, and a grandson after him.§ (While this gentleman does not rightly belong to a medical history of Rice County, Minnesota, he was a medical man, retired or not, with a high degree of civic consciousness, interested in the welfare of Faribault and so an inspiration to other members of the profession).

Knight, George H.—A graduate of the Medical School of the University of New York City in 1881. He received his Minnesota license on October 13, 1883, and established his practice at Faribault where he was a highly respected member of the

‡He may be identical with Dr. Niles (also Nils or Nieves) R. H. Juell (or Jewell), a graduate from Rush Medical College who practiced in Becker County in the late 1880's, who was licensed in Minnesota in 1885 and practiced in Goodhue County in the middle 1890's and in Swift County around 1903 and 1905, and who moved to California around 1904.

§See "Medicine and Its Practitioners in Olmsted County Prior to 1901" by Nora H. Guthrey, MINNESOTA MEDICINE, 1949-1951.

HISTORY OF MEDICINE IN MINNESOTA

medical profession. He stayed there until at least 1890. Between 1895 and 1905 he was in Lakeville, Conn.

Lang.—A Dr. Lang was a partner of Martin L. Mayland for a short time—so short a time, in fact, that his only memory here in Faribault is no more than a faint memory of his surname. Dr. Mayland practiced in Faribault from 1893 to 1937.

Lawrens, Lambert.—His professional card which appeared in the *Faribault Republican* in 1887 read:

"Lambert Lawrence,
Physician and Surgeon.
Office next to Dr. Dale's
in Theopold block. Speaks
English, French*, and German."

No other information about him is available.

Leighton, L. W.—This M.D. came to Faribault in the late summer of 1855 or 1856, and vanished like a gentle unnoticed summer's breeze. He opened an office opposite the Brunswick Hotel, but, like the King's men, he marched to the assault and marched right back again.

Lynde, Cornelius V.—Homeopath. Graduate of the Hahnemann Medical College and Hospital of Chicago in 1880 or 1883. He was born in the State of Vermont in the year 1858. He was licensed to practice medicine in Minnesota in 1886 and came Faribault from West Concord, Dodge County, in 1890. He had practiced in other Minnesota towns and villages: Medford, Parkers Prairie, et cetera. He died in a diabetic coma in the Owatonna Hospital on November 27, 1926, as another of those tragic cases of a physician who failed to heal himself. At Faribault he bought the practice of Dr. T. W. Roberts and became his successor. He must have thought that he bought a lemon and learned the bitter lesson that one cannot purchase the confidence of patients with filthy lucre, but must earn it by one's own merit, when he threw it all overboard several years later, perhaps himself already a diabetic and with that handicap, without being aware of it.

Martinez, St. V.—This medical man moved to Northfield from Rochester, Minnesota, in 1879. In 1893 he was practicing in Cedar Rapids, Iowa. He wrote at that time to a friend that he was practicing in that state under the "Time Act" of that state, and that he had been appointed an "Official Counsel of the World's Congress." In 1896 he was listed in a four-state medical directory as a resident of Cedar Rapids, Iowa. His name is not in the 1st edition of the AMA Directory (1906), or later. He was born in Bohemia and arrived in Minnesota in the 1870's. He lived for a few months in Steele County. His professional card in a Rochester newspaper in August of 1874 describes him as an "eclectic physician." He paid a visit to Europe in 1878.

Mattocks, Brewer.—Came to Faribault in 1881 and was still there in 1886 when he had his residence and office at the Corner of Cedar and Hickory Streets.

Dr. Mattocks, one of Minnesota's outstanding physicians, was born in Keeseville, New York on September 12, 1841. He came to St. Paul with his father in 1856. In

*As late as the year 1912, approximately one-fourth of the population of Faribault was made up of immigrants from the Canadian Province of Quebec and/or their descendants. They spoke Old French, saying, *vad couehe* for *allez coueche*, and *il fait fret* for *il fait froid*, et cetera.

HISTORY OF MEDICINE IN MINNESOTA

1861 he graduated from the Philadelphia College of Pharmacy and in 1864 from a medical college in St. Louis. Between 1861 and 1865 he served in the Civil War as hospital steward and as assistant surgeon. In 1865 he started to practice in St. Paul and continued until 1881. He was one of the founders of the Ramsey County Medical Society in 1870, was on the faculty of the St. Paul School for Medical Instruction (1872) and was very active in the affairs of the Minnesota State Medical Society.

From Faribault he moved to Pittsburgh, Pennsylvania and he retired in 1900. Dr. Mattocks had a fine education and he published a number of poems. He died at the Old Soldiers' Home in the Twin Cities in 1934.

Mayland, Lewis L.—He took care of the practice of his brother, Dr. Martin L. Mayland, while his elder brother, three years his senior was absent from Faribault during the summer of 1896. He was born October 13, 1871, at Kenyon, Minnesota. Before commencing the study of medicine he taught school for two years in northern Minnesota. He graduated in 1896 from the Medical School of the University of Minnesota. He may have stayed with his brother for a while before moving to Hayfield. In 1899 he moved to Red Wing and in 1902 to Bagley, Minnesota. In 1910 he left Minnesota for Chester, Montana, and established himself in Great Falls in 1913. He died in 1942.

Mayland, Martin Lars.—Was born on September 23, 1868, on a farm at Aspelund, Goodhue County, Minnesota, to the Scandinavian immigrants and pioneer settlers Lars A. and Unna Thorsness Mayland. He attended Goodhue County public schools and Carleton College of Northfield. His medical training he received at the Medical School of the University of Minnesota from which he graduated in 1892. During the years at the University he spent all his spare time at weekends and during summer vacation with Dr. Edouard O. Boeckmann of St. Paul and often assisted the latter in his surgical work. He was licensed shortly after his graduation and he started to practice in Mankato. After only a year there he moved to Faribault to establish himself permanently.

Avid for further training, he graduated from the Post-Graduate Medical School of New York in 1893 and took an intensive course of six weeks in operative surgery at McGill University, Montreal, in 1895.

When he arrived in Faribault he had an unusually complete set of surgical instruments for that time, a team of horses, a buggy, a good fur coat and one thousand dollars. There he found a number of physicians, but no hospital. Being a surgeon at heart and of a not too healthy constitution he sorely missed the hospital and he became instrumental in the founding in 1895 of the Hunter Hospital in Faribault—ironically almost adjoining the cemetery on the western outskirts of the town. There he performed the first operation and did most of the surgery during its existence of eleven years. It was closed in 1906.

It was at this hospital that he met Josephine Olivette Sullivan. Miss Sullivan had graduated from the Minneapolis General Hospital Training School for Nurses in March, 1901, and only a few days later became supervisor of the Hunter Hospital. They were married on November 30 of the same year. She continued to assist him as nurse and anesthetist especially during the period of more than two years between the closing of Hunter Hospital and the opening of St. Luke's Hospital on May 16, 1909, when all surgery had to be carried out in homes. His and his nurse's painstaking care in preparing a room for operation and his meticulous surgical procedures resulted in healing by primary intention of all his clean cases during this period—and there were over 300 operations, mostly of a major type.

HISTORY OF MEDICINE IN MINNESOTA

Dr. Mayland practiced surgery in Rice County for over forty-four years. He had a suave and pleasingly dignified personality, was sympathetic, kindly, but firm and uncompromising when occasion demanded it. He died on November 16, 1937, in his seventieth year in a Rochester Hospital of Hodgkin's Disease. He was survived by his wife, a son, Martin L. Mayland of St. Louis, Kentucky; his brother, Dr. Lewis L. Mayland of Great Falls, Montana; and two sisters. The Maylands had lost one daughter.

Dr. Mayland had been prominent in civic and political affairs. During his last twenty-five years he served three terms as county coroner; he held this position for six years prior to his death. For several years he was city health officer of Faribault. His work in the establishment of Hunter Hospital has been mentioned; he also took an active part in the establishment of St. Luke's Hospital. During World War I he was a member of the volunteer service corps; he was drafted and prepared for active service when the war ended. He was a member of the Rice County Medical Society, the Southern Minnesota Medical Association, the Minnesota State Medical Association and the American Medical Association. Dr. Mayland was an active member of the Congregational Church and was exalted ruler of the Faribault Lodge B.P.O.E.

Morbeck, Zacharias.—This medical man was listed as practicing the healing art in Northfield in 1893. He was not licensed in Minnesota and nothing more is known about him.

Nelson, Louis F.—Graduate of the Medical School of the University of Maryland in 1849. Licensed to practice in Minnesota on November 12, 1883. He, too, was one of many, who came to Faribault and went on, again, like a ghost ship passing in the night.

Nichols (or Nicholas), B.—A homeopath. He was one of the sixteen signers of the articles of the Association of the Minnesota State Homeopathic Institute at the Globe Hotel in St. Paul in 1867. He settled in St. Paul in 1852. He moved to Northfield in 1853 and later became a physician to the Minnesota Institute for the Education of the Deaf, Dumb and Blind, which opened in Faribault in 1863. He was elected president of the Minnesota State Homeopathic Association in 1873. He was reported as practicing in Portland, Oregon, in 1882.

Orcutt, Isaac Hall (also I. H. Orcutt and Hall Orcutt).—He came to Northfield in 1896 and stayed there until his death in 1912. This part of his life was spent doing research on Alcohol and Tobacco, and lecturing about them to the Women's Temperance Union in various towns in Minnesota and Iowa. He served on the Town School Board of Northfield for several years and was engaged in overseeing certain properties of his own in various parts of the State. He died in Northfield on October 7, 1912, in his sixty-sixth year, of Bright's disease, survived by his second wife (the first had died in 1884), a son and a daughter. He was buried in Oaklawn Cemetery, Northfield.

Dr. Orcutt was born on June 7, 1847, near Westmoreland, Oneida County, in the State of New York. In 1866 he studied at Groveland Seminary at Wasioja. Then he taught in the school of his boyhood in Concord Township. It seems that he started the study of medicine with a private physician as preceptor but then went to the Chicago Medical College from which he graduated on March 21, 1876. Immediately he began to practice in Byron, Olmsted County. In April, 1879, he left to take a course of natural sciences at the University of Pennsylvania and received a degree of doctor of philosophy before he returned to his practice in June, 1880. Poor health

HISTORY OF MEDICINE IN MINNESOTA

caused him to restrict his medical work to office practice and early in 1883 he retired to a farm. In 1884 he moved to the Dakota Territory, where after two years of medical practice he was appointed professor of natural sciences at the Dakota Agricultural College, also as college physician. It seems it was during these periods that his special interest in ill effects of alcohol and tobacco on the nervous system developed. In 1893 he moved to Owatonna where in the following year he published a small book, *Microbes and Men*. As mentioned, in 1896 he moved to Northfield.**

Pentz, F. C. F.—Born in Hanover, Germany, on January 20, 1823. He received an education at the high school, and in 1841-1842 served in the Prussian army. In 1846, he entered Göttingen Medical Institute, but did not take a full course. He returned to the Prussian army in 1848. He came to the United States in 1850. In 1855 he married Miss Rebecca Abbott, a native of Indiana. One year later he removed to Minnesota, but did not settle permanently in the state until the year 1867. The History of Rice County (1882) goes on to state: "Mr. Pentz has practiced as a physician part of the time since coming to this country." He was in Northfield from 1881 to 1882.

• **Phillips, John Rutledge.**—Practiced in Northfield for over twenty years—until one year before his death. He graduated from the Medical School of the University of Victoria, Montreal, Canada, in 1884 and came to Minnesota in the same year, where he was licensed on November 10. He first practiced in Dundas and moved to Northfield in the early 1890's. Because of illness he left Northfield about a year before his death. The last six months he spent at the Presbyterian Hospital in Chicago suffering from a heart condition. He died on September 2, 1912. He was representative, in 1909, in the Legislature.

For fifteen years he served on the United States Pension Examining Board in Northfield. He was a member of all Masonic Lodges, the Knights Templars and Osman Temple of St. Paul.

It is said that Dr. Phillips came to Dundas completely without funds—all he had was his medicine bag. At first he walked for miles to visit his patients, but after a while secured snowshoes. Later he made calls on horseback and finally was able to have a horse and buggy. He was known as a genial man, beloved by his patients and friends. When he moved to Northfield he soon was a successful physician. Dr. Phillips never married.

In 1906 he was joined in Northfield by his nephew, Dr. John Gilbert Phillips. The latter was born at Drumbo, Ontario, January 7, 1877, and came to the United States at the age of 11 with his parents who settled in Marlette, Michigan. He graduated from Northwestern University in 1905. After about a year with the Lenont Clinic at Virginia he came to Northfield to join his uncle. This association lasted several years. Dr. John Gilbert Phillips practiced a total of about sixteen years in Northfield and died there November 22, 1922, at the age of forty-five. His widow, Nellie W. Phillips, still lives in Northfield (1955).

Pillsbury, Charles.—He was the homeopath partner of Dr. D. H. Roberts of Owatonna in 1898. He came from Duluth, where he had practiced for eleven years. He practiced in Faribault (1898-1900) and then returned to Duluth.

(To be continued in the July issue)

**See the extended biography in "Minnesota and Its Practitioners in Olmsted County Prior to 1900" by Nora H. Guthrey, MINNESOTA MEDICINE, 1949-1951.

Meetings and Announcements

MEDICAL MEETINGS

State

MINNESOTA STATE MEDICAL ASSOCIATION, annual meeting, Mayo Civic Auditorium, Rochester, May 21-23, 1956.

Northwest Pediatric Society, spring meeting, Rochester, May 22, in conjunction with meeting of Minnesota State Medical Association. Secretary, Dr. T. C. Papermaster, Minneapolis.

National

American Association of Blood Banks, ninth annual meeting, Somerset Hotel, Boston, Massachusetts, September 3-5. Secretary Marjorie Saunders, 725 Doctors Building, 3707 Gaston Ave., Dallas, Texas.

American Cancer Society and National Cancer Institute, Third National Cancer Conference, Sheraton-Cadillac Hotel, Detroit, Michigan, June 4-6. Write National Cancer Conferences Coordinator, American Cancer Society, 521 West 57th Street, New York 19, New York.

American College of Physicians, 37th annual session, Los Angeles, California, April 16-20.

American Ophthalmological Society, Hot Springs, Virginia, May 31 to June 2.

Medical Library Association, fifty-fifth annual meeting, Hotel Statler, Los Angeles, California, June 18-22. Write Mrs. Ella Crandall, Librarian, Los Angeles, County General Hospital, 1200 North State Street, Los Angeles 33, California.

Microbiological Institute, ninth annual meeting, Department of Biological Sciences, Purdue University, Lafayette, Indiana, June 4-9. Write Division of Adult Education, Engineering Administration Building, Purdue University, Lafayette, Indiana.

Symposium for General Practitioners on Tuberculosis and Other Chronic Pulmonary Diseases, fifth annual meeting, Saranac Lake, New York, July 7-13. Dr. Edward N. Packard, general chairman, Symposium for General Practitioners, P.O. Box 262, Saranac Lake, New York.

Third National Cancer Conference, Detroit, Michigan, June 4-6.

International Meetings

Canadian Medical Association, Quebec, Canada, June 10-14. Secretary, Dr. Arthur D. Kelly, 150 St. George St., Toronto, Ontario, Canada.

Congress of International Society of Hematology, Hotel Somerset, Boston, Massachusetts, August 27 to September 1. Secretary, Dr. W. C. Maloney, 39 Bay State Road, Boston, Massachusetts.

Inter-American Congress of Cardiology, Havana, Cuba, November 4-10. Write Dr. Ramon Aixala, Apartado 2108, Havana, Cuba.

International Congress of Clinical Chemistry, Hotel New Yorker, New York, September 9-14. Secretary, John G. Reinhold, 711 Maloney Building, University of Pennsylvania, Philadelphia 4, Pennsylvania.

World Medical Association, Havana, Cuba, October 9-15. Secretary, Dr. Louis H. Bauer, 345 E. 46th St., New York 17, New York.

Pan American Congress on Cancer Cytology, Miami, Florida, January 8-12, 1957. Dr. J. Ernest Ayre, chairman, 1155 N. W. 14th St., Miami, Florida.

European Congress of Cardiology, Stockholm, Sweden, September 10-14. Dr. Karl E. Grewin, secretary, Soder-sjukhuset, Stockholm, Sweden.

International Congress on Diseases of the Chest, Cologne, Germany, August 19-23. Murray Kornfeld, executive director, 112 East Chestnut St., Chicago 11, Illinois.

International Congress of Gastroenterology, London, England, July 18-21. Herman Taylor, secretary, London Hospital, White Chapel, London E. 1, England.

International Congress of Internal Medicine, Madrid, Spain, September 19-23. Dr. J. C. DeOya, secretary, No. 90, Madrid, Spain.

International Congress of Radiology, Mexico, D. F., Mexico, July 22-28. Dr. Jose Noriega, secretary, Tepic 126 (2 e piso), Mexico, D. F. 7, Mexico.

International Congress of World Confederation for Physical Therapy, Statler Hotel, New York, New York, June 17-23. Mildred Elson, American Physical Therapy Association, 1790 Broadway, New York 19, New York.

MEETINGS AND ANNOUNCEMENTS

MINNESOTA ACADEMY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

The Minnesota Academy of Ophthalmology and Otolaryngology adopted the following resolution at its February meeting in Saint Paul with respect to professional association between optometrists and physicians:

"The Minnesota Academy of Ophthalmology and Otolaryngology is officially opposed to the professional association of optometrists and physicians practicing in this state; and that a copy of such official action be placed in the hands of every member of the Minnesota State Medical Association.

"The term 'professional association' indicates the joint office practice of a physician and optometrist for the purpose of diagnosing or treating eye diseases; and (or) the examination for, or prescribing of, eye glasses."

MINNESOTA SOCIETY OF NEUROLOGY AND PSYCHIATRY

Principal speaker at a meeting of the Minnesota Society of Neurology and Psychiatry in St. Paul on March 13 was Dr. Irving C. Bernstein, who presented an inaugural thesis entitled, "Psychiatric Aspects of Dysmenorrhea." The paper was discussed by Dr. John L. McKelvey.

MEDICLINICS OF MINNESOTA

Mediclinics of Minnesota, a clinical lecture course, was held at Fort Lauderdale, Florida, from March 5 to 14. Lectures and panel discussions were presented every weekday morning and late afternoon. Members of the faculty for the course included Dr. Harold F. Buchstein, Dr. Harry B. Hall, Dr. Arthur C. Kerkhof, Dr. Ames W. Naslund, Dr. O. L. Norman Nelson, Dr. Owen F. Robbins, Dr. Albert V. Stoesser, Dr. Robert J. Tenner, Dr. Richard L. Varco and Dr. Edgar A. Webb.

ST. PAUL SURGICAL SOCIETY

The St. Paul Surgical Society will meet at the Minnesota Club, St. Paul, on April 18, with dinner at 6:00 p.m. and scientific session at 8:00 p.m. Dr. John McLean will discuss "The Conservation of Ovarian Tissue."

MINNEAPOLIS SURGICAL SOCIETY

The next meeting of the Minneapolis Surgical Society will be held at the Calhoun Beach Hotel on May 3, with dinner at 6:00 and scientific session at 8:00 p.m. Principal speaker will be Dr. Ernest Lampe of Cornell University.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY

Applications for certification by the American Board of Obstetrics and Gynecology for the 1957 Part 1 examinations are now being accepted. Application for re-examination, as well as requests for resubmission of case abstracts, must be made before October 1, 1956. All communications should be sent to the secretary, Dr.

CRIPPLED CHILDREN SERVICES SPRING CLINIC SCHEDULE

The Crippled Children Services spring clinics are now being held at various cities in Minnesota. Clinics have been held at Cloquet, Grand Rapids, St. Cloud, Albert Lea, Hibbing and Faribault. Forthcoming clinics are listed below:

**Gaylord	April 25	Le Sueur, Brown, Nicollet Carver, Scott, McLeod, Sibley
*Worthington	April 28	Cottonwood, Nobles, Jackson, Pipestone, Murray, Rock
*Detroit Lakes	May 5	Becker, Mahnomen, Clay
*Thief River Falls	May 12	Kittson, Red Lake, Marshall, Roseau, Pennington
**International Falls	May 18	Koochiching, Lake O'Woods
*Brainerd	May 26	Crow Wing, Wadena
*Morris	June 2	Bigstone, Pope, Douglas, Stevens, Grant, Traverse

*County Welfare Board Social Service for clinic intake arranged by Field Representative. All new patients are requested to bring written referrals from their family physician.

**Social problems arising at clinic will be referred to County Welfare Board on day of clinic. In-take service not necessary from County Welfare Board. New patients are requested to bring written referrals from their family physicians. All patients should have appointments arranged through local Public Health Nurses.

Note: Gillette State Hospital patients will not be attending any orthopedic field clinics.

CONTINUATION COURSES AT THE UNIVERSITY OF MINNESOTA CENTER FOR CONTINUATION STUDY

Dates		
May 7-12	Electrocardiography for General Physicians	Dr. Harold Levine Harvard University Medical School
May 14-19	Proctology for General Physicians	
May 24-26	Surgery for Surgeons	Dr. Robert M. Zollinger Ohio State University College of Medicine
June 4-6	Dermatology for General Physicians	

Woman's Auxiliary

AN AREA PLAN

Mrs. L. R. Boies

A large and growing auxiliary presents problems which must be recognized. The membership of the Auxiliary to the Hennepin County Medical Society has experienced a rapid growth in the past few years, but the attendance at meetings and group participation in our activities remains fairly constant. An appraisal of the situation and re-evaluation of the Auxiliary's intent is imperative.

One objective which we must constantly keep in sight is this: to accomplish what we plan requires the enthusiasm and support of every individual member—in her lies the life of our organization. She must be mindful of her membership, which is unique. Our program is a broad one, and we want every member to feel that she is an important cog in a community group of women banded together to further the ideals of a highly respected profession—medicine.

Present-day problems must be recognized, also. Younger women, our leaders tomorrow, are finding permanent help in the home almost a legend of the past. As a result, activity outside the home that offers them what they want takes priority. Traffic problems and congested parking problems have eliminated late afternoon meetings. The trend is toward morning or mid-day gatherings.

With these facts in mind, and with the added problem of a rapidly growing organization where we find ourselves at meetings in a sea of unknown faces, we have devised what we hope is a workable plan. It has limitless potentialities if carefully directed.

At the beginning of our year, the Auxiliary to the Hennepin County Medical Society inaugurated the area plan, dividing its membership into small groups according to the neighborhood in which each member lives. In this way, individuals experience a more personal relationship with other members and become better acquainted. From the organizational point of view, the large, unwieldy group becomes more manageable and there is a closer contact with each member.

This idea is not a new one; it has proven successful on two occasions. In the spring of 1941, our benefit for fund raising was operated successfully under such a plan. In the fall of 1953, it was used for simultaneous civil defense meetings. Echoes of "let's have more of these friendly, intimate gatherings" were heard.

Since the groundwork for the plan was available from this earlier civil defense experience, the same boundaries for the areas have been maintained. Because we had followed the same pattern, it was very simple to correlate auxiliary civil defense work with that of the Medical Society Civil Defense Co-ordinator, Dr. Carl W. Waldron, for whom we are doing a project.

The Auxiliary has been divided and combined into ten groups. Where the medical population was sparse, several zones were combined, but each part has kept its identity. Each group has a chairman directly re-

sponsible to the area chairman who is a member of the Board of Directors. When a new member joins the Auxiliary, her name is sent to the area chairman who then places her in her respective group. A close follow-up by the group chairman becomes a welcoming gesture.

A purposeful goal is a prerequisite in any undertaking. This year's area projects have been to complete questionnaires on every member in the Auxiliary and to promote closer human relationships among physicians' wives. The latter was done by having simultaneous morning "Kafe Klatsches" in each area on our regular meeting day in January. The clamorous enthusiasm for more of these gatherings gave proof of this successful venture.

Representation according to areas has been worked out on the Hospitality and Fund Raising Committees. Incorporating the Telephone Committee into the area organization would have been extremely beneficial. The area designation for each member in our yearbook would also be most advantageous.

This earnest endeavor to further friendliness, understanding and "oneness" gives to a very large membership that feeling experienced in smaller auxiliaries.

REPORT ON MID-WINTER BOARD MEETING

Mrs. L. J. Leonard

The Mid-Winter Board meeting, held at the Minnesota Club in Saint Paul, Thursday, February 9, at 10:00 a.m., was called to order by Auxiliary President Mrs. H. H. Fesler. Following roll call and reports of officers and regional advisors, committee chairmen brought out many interesting statistics and suggestions.

Mrs. M. I. Hauge, chairman of Allied Medical Careers, has available an interesting new book for use of future nurses' clubs. She feels these clubs need sponsors to further acquaint them with facts pertaining to the profession.

Mrs. P. J. Pankratz, of Mountain Lake, announced that she and Dr. Pankratz are leaving Minnesota in April for a four-year assignment in Formosa, where he will have charge of a hospital. Goodbyes were said with a tinge of sadness, as she has been a loyal worker and her absence will certainly be felt. Auxiliary members wish them God-speed in their new undertaking.

Legislation offers many challenges, according to Mrs. Philip Arzt of Saint Paul. Members should particularly keep informed on H.R. 7225, regarding amendments to the Social Security Act, and the Jenkins-Keough Bill. To be well informed on legislative matters, members are urged to read the *Bulletin*, which contains current authentic data. Also reference to the column on Medical Economics in the February issue of MINNESOTA MEDICINE will prove beneficial.

Mrs. E. S. Mariette, Wayzata, urged that the auxiliary co-sponsor Mental Health Week, April 29 to

WOMAN'S AUXILIARY

May 5. Therapy for the patient and a better understanding of the patient's problem can completely change the picture, as it did in the state of Kansas, but money has to be spent before it can be saved; an educational program is being promoted for this purpose. The assembly voted to co-sponsor this program along with the Junior Association of Commerce and the Federation of Women's Clubs.

Mrs. W. T. Greenfield, Cokato, stated that a list had been compiled of the various medicines desirable for shipping; this will be a great help to the chairmen assembling surplus drugs which they have collected from the doctors' offices. She also has a list of agencies and foreign hospitals, where these supplies are needed, and it is available to anyone desiring it.

Mrs. L. P. Howell, Rochester, gave a stimulating synopsis of the convention of presidents and presidents-elect in Chicago. She recommended reading in full Dr. Ernest B. Howard's speech to this assembly, a copy of which may be found in the January *Bulletin*.

Every auxiliary is requested to sponsor one safety program a year. Mrs. Charles Merkert, Minneapolis, suggested co-operating with the national auxiliary in promoting its new project "Gems" (Good Emergency Mother Substitute). A new series titled "Baby Time," which concerns baby sitters, will be seen on KSTP-TV on Tuesday and Thursday at one o'clock. She also recommended a new booklet, "You're in Charge," for distribution where needed.

American Medical Education Week will be April 22 to 29, according to Mrs. John Dordal, Sacred Heart. She suggested memorials and "In appreciation" cards to help swell this fund. A new book, "Face Facts," and a new film, "Danger at the Source," are both recommended as aids to a better understanding of this matter.

A new mental health kit, available through the AMA for 50 cents, should be in the hands of every auxiliary chairman, is the opinion of Mrs. William Gjerde of Lake City. She also suggested that members endeavor to work with local Chamber of Commerce groups when presenting programs to interest lay people.

It was a pleasure to see Mrs. William Ferguson, Walnut Grove, new president of the Lyon-Lincoln Auxiliary. Her secretary is Mrs. R. R. Remberg, Tracy. Congratulations to this newly formed auxiliary.

County presidents had items of interest to report. Mrs. F. T. Becker, Duluth, reported earning \$400 at a rummage sale. The St. Louis County Auxiliary also sponsored a Glaucoma Detection Day. Mrs. Andrew Sinamark, Hibbing, said the Iron Range Auxiliary periodically gives awards to nurses during training upon completion of a specified number of hours of service. Mrs. Karl Walfred, St. Cloud, reported that more than 100 junior and senior high school girls from Foley, Cold Spring, and St. Cloud attended their nurse recruitment tea on February 7, which included a hospital tour, a panel discussion and showing of the film, "Nurses in White."

Dr. James Rogers Fox, radio and television director for the Minnesota State Medical Association, spoke on "The Doctor's Place in the Community." Polls show

doctors at the top of the list as far as individual esteem is concerned, though they do not always occupy this position from a financial standpoint and by the amount of community work they do. It is much more difficult to attain a medical degree today than it was ten years ago, and the average age before a graduate entering a specialty field is ready to practice is thirty. Doctors generally err by not entering into public activity; they should live in a total society, not just in the office and the hospital.

Mr. Harold Brunn, assistant executive secretary of the State Medical Association, spoke on the American Medical Education Foundation, and said there were eighty-one approved medical schools, private and public, in the country. Ten million dollars is needed annually to supplement the income the Foundation now has. The new "Eighty Dimes" promotion for AMEF should not be a door-to-door canvas; contributions should be solicited only within one's own family and medical group. Always check with your county society before taking action on any matter and be sure that it is approved by the Council.

The Rochester Auxiliary invited all Auxiliary members to attend the State Convention in that city, May 21 to 23. The national convention will be in Chicago, June 11 to 13.

A special thank-you to the hostesses for the day—Mrs. Wallace Ritchie and Mrs. J. R. Meade, both of Saint Paul, who were in charge of arrangements.

The Food and Drug Administration has announced that the evidence of record does not warrant removal of the hypnotic drugs acetyl carbromal and bromural from the list of drugs required by federal law to bear the label statement: "Warning: May be Habit Forming."

This decision was made on the basis of evidence received at public hearings held on June 7 and September 13, 1955. A summary of the evidence and a proposed order have been published in the Federal Register. Interested persons who appeared at the hearings are privileged to file exceptions to the tentative order with specific references to the pages of the transcript of testimony or to exhibits on which the exceptions are based.

THE PRESENT STATUS OF THE TREATMENT OF VARICOSE VEINS

(Continued from Page 229)

9. Buxton, R. W.; Farris, J. M.; Moyer, C. A., and Coller, F. A.: Surgical treatment of long standing deep phlebitis of the leg. *Surgery*, 15:749-756, 1944.
10. Bauer, G.: The patho-physiology and treatment of the lower leg stasis syndrome. *Angiology*, 1:161-169, 1950.
11. Murphy, T. O.: Department of Surgery, University of Minnesota. (Unpublished data).
12. Scott, H. W., and Roach, J. F.: Phlebography of the leg in the erect position. *Ann. Surg.*, 134:104-109, 1951.
13. Felder, D. A., and Murphy, T. O.: The evaluation of a method of phlebography of the lower extremities. *Surgery*, 37:198-205, 1955.
14. Felder, D. A.; Murphy, T. O., and Ring, D.: A posterior subfascial approach to the perforating veins of the lower extremity. *Surg., Gynec., & Obst.* (published).

In Memoriam

FREDERICK GAY CARTER

Dr. Frederick G. Carter, superintendent of Ancker Hospital, Saint Paul, from 1924 to 1935, died February 19, 1956, in Cleveland. He was sixty-seven years of age.

Dr. Carter served as president of the Minnesota Hospital Association and the American College of Hospital Administrators. He was a member of the Ramsey County Medical Society and the Minnesota State Medical Association.

He became administrator of Christ Hospital in Cincinnati after leaving Ancker, and in 1939 he went to St. Luke's Hospital in Cleveland.

EDWARD A. COLP

Dr. Edward A. Colp, a physician in Robbinsdale, Minnesota, for twenty-eight years, died February 10, 1956, while vacationing on the gulf coast aboard the *S.S. Monarch of the Seas*. He was fifty-five years old.

A native of Fargo, North Dakota, Dr. Colp graduated from Tufts Medical School, Boston, Massachusetts.

He was a member of the Hennepin County Medical Society, the Minnesota State Medical Association, the American Medical Association and Phi Chi medical fraternity.

Dr. Colp served as a commander in the Navy during World War II.

Surviving are his wife, Hazel A.; a son, Richard Kolling, Minneapolis; a daughter, Mrs. Robert Corrigan, Northfield, Minnesota; his stepmother, Mrs. Utta Colp, Miami, Florida; a brother, Donald Gray, Jr., Tucson, Arizona; a sister, Mrs. Robert D. Chellis, Weston, Massachusetts, and a stepsister, Mrs. Donald G. Burch, Saint Paul.

ALLAN FRANCIS GIESEN

Dr. Allan F. Giesen, physician and surgeon of Starbuck, died January 26, 1956, in Minneapolis. He was fifty-two years old.

Born in Groton, South Dakota, Dr. Giesen settled in Starbuck after graduating from the medical school of the University of Minnesota and served his internship at Ancker Hospital, Saint Paul, and Detroit Receiving Hospital.

Dr. Giesen was a member of the West Central Minnesota Medical Society, the Minnesota State Medical Association, the American Medical Association, and Alpha Omega Alpha and Phi Chi medical fraternities.

He was very active in community affairs as a member of the Starbuck Commercial Club, chairman of the Pope County Republican Committee, and chairman of the school board. He served on the Village Council and as mayor in 1934-35.

During World War II, he attained the rank of Commander in the U. S. Navy, seeing action in both the European and Pacific theatres. He was active in both the American Legion and the Veterans of Foreign Wars.

Dr. Giesen is survived by his wife; three sons, John, Philip, and Allan; three daughters, Allene, Toni and Kathi; his brother Earl, Delano; and his sister, Gertrude Giesen, Brigham City, Utah.

WALTER N. LEE

Dr. Walter N. Lee, Madison, Minnesota, physician for thirty-five years, died January 28, 1956, in Claremont, California. He was sixty-eight years old.

A native of Minneota, Minnesota, Dr. Lee graduated from the University of Illinois College of Physicians and Surgeons, and practiced from 1909 until 1914 in Mayville, N. D. He then moved to Madison, remaining there until 1949. At that time the family moved to California.

Dr. Lee was a veteran of World War I and was a member of the American Legion post in Madison. He was a member of the Madison Masonic lodge and of the Scottish Rite in Minneapolis. He was also a member of the Camp Release County Medical Society and the Minnesota State Medical Association.

Survivors include his wife; a daughter, Mrs. J. L. Armstrong, Cincinnati Ohio, and three sisters.

BERT G. LEVIN

Dr. Bert G. Levin, Saint Paul eye, ear, nose and throat specialist, died February 9, 1956. He had been with the Earl Clinic for twenty-eight years.

Dr. Levin was born at St. James, Minnesota, in 1899. He graduated from the medical school of the University of Minnesota in 1924 and interned at Minneapolis General Hospital. He was a member of the staff at Midway and Mounds Park Hospitals.

A member of the Ramsey County Medical Society, the Minnesota State Medical Association and the American Medical Association, Dr. Levin was also a fellow of the American College of Surgeons and a member of the American Academy of Otolaryngology.

Dr. Levin was on the board of Mount Zion Temple and was a past president of B'nai B'rith.

He is survived by his wife; two daughters, Susan and Jane; two brothers, Dr. Alfred Levin of Miami and David Levin of Grand Rapids, Michigan, and a sister, Mrs. Isadore Simon of Birmingham, Alabama.

DAVID POTEK

Dr. David Potek, Minneapolis, died January 11, 1956. He was fifty-one years old.

At the time of his death, Dr. Potek was on the staff of the Cambridge State Hospital, Cambridge, Minnesota. He was previously on the staff of the Glen Lake Sanatorium at Oak Terrace.

Born in Brailov, Russia, Dr. Potek graduated from the University of Minnesota medical school. He practiced medicine at International Falls, Minnesota, for

IN MEMORIAM

a number of years and served with the army medical corps during World War II.

He was a member of the East Central Minnesota Medical Society and the Minnesota State Medical Association.

Survivors include his wife, Lillian; a daughter, Louise, and two sons, Arnold S. and Jason.

GEORGE E. SENKLER

Dr. George Senkler, Saint Paul physician for more than fifty years, died February 4, 1956. He was eighty-six years old.

Born in St. Cloud, Dr. Senkler attended the University of Minnesota and the University of Pennsylvania. He was a partner in the Miller Clinic and was associated many years with St. Luke's Hospital.

He was a member of the Ramsey County Medical Society and a life member of the Minnesota State Medical Association. He was also a "Fifty Club" member.

Mrs. Abigail Senkler, his wife; Mrs. J. Fuller Brown of Newport News, Virginia, his daughter, and seven grandchildren are survivors.

WALTER HERMAN UDE

Dr. Walter H. Ude, Minneapolis radiologist, died of a heart attack February 10, 1956, while he and Mrs. Ude were vacationing in Hawaii. He was fifty-nine years old.

A native Minnesotan, born in Vernon City in 1896, Dr. Ude graduated from the University of Minnesota. He interned and studied roentgenology at Minneapolis General Hospital. He had practiced in Minneapolis for thirty years, and was senior partner in the firm of Ude, Borman, Ahern and Stone.

Dr. Ude was a clinical professor of radiology at the University of Minnesota medical school. Recently, he was elected vice president of the Radiological Society of North America.

Dr. Ude was an active member of the Minnesota State Medical Association, serving in the House of Delegates and as a member of the Committee on Tuberculosis. He belonged to the Hennepin County Medical Society, the American Medical Association, the American Roentgen Ray Society, the American College of Radiology and Alpha Omega Alpha, honorary medical fraternity.

He was a diplomate of the American Board of Radiology, a veteran of World War I, a member of the Minneapolis Club and the Thirteen Club.

Survivors include his wife, Valborg; two brothers, August, Minneapolis, and Arthur, Saint Paul; and three sisters, Mrs. Anne Peterson, Spring Valley, Minnesota, Mrs. Doris Tensing, Dallas, Texas, and Mrs. Clara Halsey, Terrell, Texas.

IRVING GEORGE WILTROUT

Dr. Irving G. Wilttrout, born November 22, 1885, in Hudson, Wisconsin, died February 1, 1956, in Oslo, Minnesota, where he began his practice in 1920.

Dr. Wilttrout studied medicine at the Wisconsin College of Physicians and Surgeons and practiced in Swan-

ville, Minnesota, for a few years before serving in the medical corps during World War I.

Dr. Wilttrout was prominent as a civic leader in Oslo, serving as mayor and as a member of the Board of Education. He was area health officer and was the Marshall County Draft Board Medical Officer. He was instrumental in building the Oslo War Museum and spent much time directing the exhibits.

He was a member of the Red River Valley County Medical Society, the Minnesota State Medical Association and the American Medical Association.

Dr. Wilttrout is survived by his wife; two daughters, Mrs. Robert Dryden of Atlanta, Georgia, and Mrs. James Ritchie, Chicago, Illinois; a sister, Florence Wilttrout, Chippewa Falls, Wisconsin, and two grandchildren.

Burial was at Fort Snelling National Cemetery in Minneapolis.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

(Continued from Page 245)

Rice County Jail on May 19, 1955, and was not apprehended until July 16, 1955, when he was arrested in Minneapolis. Lawton was therefore also charged with the crime of escape from jail and on February 8, 1956, he entered a plea of guilty to this charge and also to the information charging him with having four prior convictions for felonies. For the crime of escape the defendant was sentenced by Judge Anderson to a term of three years in the Minnesota State Prison, the sentence to run concurrently with the fifteen-year sentence.

In the grand larceny case, the defendant was charged with issuing without funds a \$50.00 check on or about August 31, 1954, which he signed "R. Thayer Lawton, M.D., White Bear Lake," and representing that he was a doctor of medicine to a Faribault man, who cashed the check. It was alleged that the defendant knew at that time that he was not a doctor of medicine and that he had no funds on deposit at the bank. After he escaped from jail in Faribault, Lawton continued to represent himself as a doctor of medicine under an assumed name in Minneapolis. On July 14, 1955, it was reported to the Minnesota State Board of Medical Examiners that a "Dr. Jones," falsely representing himself as a teacher in pathology at the University of Minnesota, had issued two checks in Minneapolis without funds for a total of \$25,025.00. When "Dr. Jones" was apprehended two days later in Minneapolis he proved to be Lawton. Lawton has no medical training and is not licensed to practice any form of healing in Minnesota.

Lawton has two prior convictions for felonies in the District Court of Hennepin County as follows: On January 7, 1926, he was convicted of forgery and sentenced to a term of not to exceed 5 years in the State Prison at Stillwater. He was sentenced on March 16, 1949, to an indeterminate term of not to exceed 7 years in the same institution on a grand larceny charge. The defendant was also convicted on March 24, 1928, in Federal District Court in St. Paul of forging an endorsement of a United States obligation and sentenced to 10 years in the United States Penitentiary at Leavenworth. Ten years later, on March 7, 1938, Lawton was convicted of grand larceny in the District Court at Libby, Montana, at which time he was sentenced to 2 years in Deer Lodge Penitentiary, Deer Lodge, Montana.